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THE STONE-MILLIS ARITHMETIC

BOOK ONE

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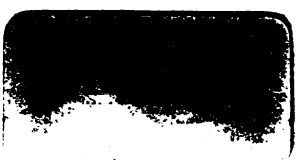

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THE

STONE-MILLIS ARITHMETICS

PRIMARY

BY

JOHN C. STONE, A.M.

HEAD OF THE DEPARTMENT OF MATHEMATICS, STATE NORMAL SCHOOL, MONTCLAIR, NEW JERSEY, CO-AUTHOR OF THE SOUTHWORTH-STONE ARITHMETICS, STONE-MILLIS SECONDARY ARITHMETIC, ALGEBRAS, GEOMETRIES, ETC.

AND

JAMES F. MILLIS, A.M.

HEAD OF THE DEPARTMENT OF MATHEMATICS, FRANCIS W. PARKER SCHOOL, CHICAGO, CO-AUTHOR OF THE STONE-MILLIS SECONDARY ARITHMETIC, ALGEBRAS, AND GEOMETRIES

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PREFACE

THE Stone-Millis Arithmetics have been prepared with a view to adapting the teaching of arithmetic more adequately to the interests and to the needs of children of the present day.

The adaptation to children's interests is secured through the use of the play instinct in the primary grades, and through the use, in all grades, of problem material relating to the various activities of children in and out of school, and to facts touching their experiences more or less directly. The adult point of view and the interests of adults have not been unduly obtruded into the work. In the second and third grades, especially, numerous games have been introduced that have been found, by actual use in the schoolroom, to be of intense interest to children, and to provide excellent drill work. Much problem material correlated with the hand work or industrial arts work of the modern school has been given. Many groups of problems relating to the common phases of community life with which the child comes into daily contact, have been used, such as collecting the mail, getting the coal supply, problems of the fruit vender, the parks, railroad traffic, etc.

Underlying this attempt more adequately to adapt the teaching of arithmetic to the interests of children, is the authors' belief in the fundamental principles of education:

I. *All mental growth comes through the self-activity of the individual pupil in solving situations that to him are concrete and vital.*

II. *For school work to be educative there must be genuine legitimate motive or purpose underlying it; there must accompany it the feeling—the positive conviction—upon the part of the pupil, that the knowledge gained is going to further his present or future interests in some way.*

In adapting arithmetic to the needs of children, all topics that do not enter at some time or other into the everyday life of the average citizen, and all obsolete topics that represent business practices that have been abandoned, have been wholly eliminated.

The authors are thorough believers in adequate drill, and the abundant drill exercises and the plentiful provision for motivated drill throughout these books, should prove a strong feature of the series.

Book One. This book covers the work recommended for the second, third, and fourth grades.

Part one contains the development of the forty-five facts of addition, and the 2's and 3's of multiplication. Special attention is called to the method of developing the twenty sums greater than 10. (See pp. 21, 22, 23.)

The games given for drill work have all been used in the classroom, under the direction of the authors, with excellent results. There are three general classes of games: those that can be used by a large class in the schoolroom (see pp. 11, 12, 14, 24, 25, 26, 39, 117, 169); those that groups of children may be encouraged to play outside of the classroom (see pp. 18, 19, 52, 59); and those suitable for one or more children to play at home (see pp. 50, 53, 79). Thus with no assignment of home work, all of the fundamental facts of addition, etc., may be mastered through play.

Part two completes the development of the facts of multiplication. The pupil discovers these facts through the 5's by

addition. Written addition and subtraction, and also multiplication and division when the multiplier or divisor does not exceed 9, are developed.

Games are continued, and problems vital to the interests of pupils of this grade are given.

Part three makes use of the tables of common measure, extends the treatment of areas of rectangles, introduces bills and sales checks, the volume of right prisms, and develops multiplication and division when the multiplier or divisor is any two-digit number. The proofs of the four fundamental processes are also introduced.

In the preparation of this series of arithmetics the authors have had the constant and most efficient aid of Gordon A. Southworth, co-author of the popular *Southworth-Stone Arithmetics*. Every page of manuscript and proof has had his critical reading and intelligent criticism.

The authors are also indebted to Miss Mabel Gaston, department of Industrial Arts, Montclair (N.J.) Public Schools, and to Miss Estelle Baker, State Normal School, Montclair, N.J., for valuable material for the lower grades.

J. C. STONE
J. F. MILLIS

DECEMBER, 1910

SUGGESTIONS TO TEACHERS

To secure the best results with this book, the teacher should follow the order and method of development of the text, and the order of the "drills." It differs fundamentally from other texts in many respects. For example, the primary facts of addition that do not exceed 10 are the only facts found through counting. To succeed with the method of the text, these first twenty-five facts must be thoroughly mastered before the others are taken up. Again, the development of the primary facts of multiplication is begun later than in most texts. This is to enable the pupil to add columns of four or five numbers in order that he may develop his tables through the 5's by addition.

The script drill tables for sight work are designed for daily practice as long as the pupil needs such practice, not merely for a single lesson. A pupil learns to recognize a group of figures as standing for a sum or a product just as he recognizes a group of letters as representing a word. Hence, these drills are written in column form just as he is to see them in his written work. It is believed, too, that he will recognize the groups more quickly in his written work if the sight drills are written in script and of a size to correspond to the written work. The script also serves a second purpose, — a copy from which to make the written figures.

The games given in this book are a few types of a large number of games used by the authors, or by those under their supervision. They not only vitalize the work and furnish a motive

for drill, but those games that can be played out of school bring into use the facts learned in school, and soon fix them in the mind of the pupil. Teachers who have never made use of games in teaching elementary number work will be surprised at the increased interest and the great saving of time in fixing the primary facts of addition and multiplication.

The ingenuity of the teacher will furnish many variations of these games and many new ones. Those used in the text for addition will be found just as useful in multiplication.

We should seek always to make the work appeal to the child's needs and interests, and supplement the texts with many problems actually met by the child in and out of school. Textbooks and courses of study are but aids. They can never displace nor even trammel wise teachers through whose judgment, character, and inspiration alone schools attain to the ideal.

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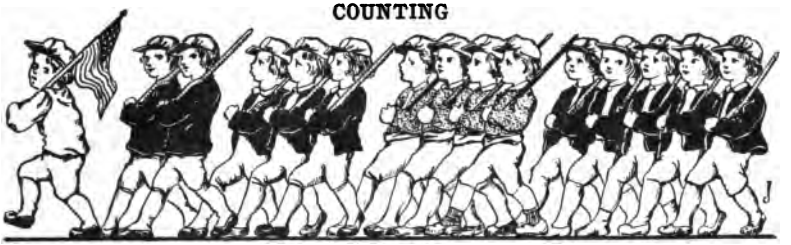
PRIMARY ARITHMETIC

PART ONE: SECOND YEAR

COUNTING



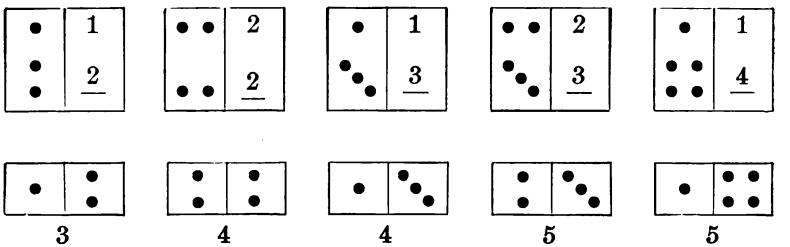
1. Two boys and one boy are how many boys?
2. Two boys and two boys are how many boys?
3. Two boys and three boys are how many boys?
4. Take one boy from three boys. How many remain?
5. Take one boy from four boys. How many remain?

6. Take one ball from five balls. How many balls are left?
7. Take two balls from five balls. How many balls are left?
8. Three balls taken from five balls leave how many?

1 apple 2 apples 3 apples 4 apples 5 apples

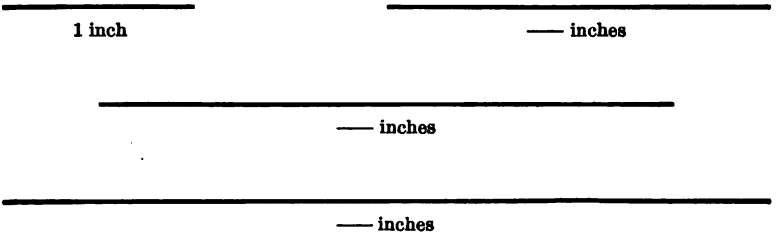
1. Make the figures that mean *one*, *two*, *three*, *four*, and *five*.

2. Tell how many:



3. One taken from three leaves how many?
4. One taken from four leaves how many?
5. 2 taken from 4 leaves how many?
6. 2 taken from 5 leaves how many?
7. If I take 1 from 5, how many are left?
8. If I take 3 from 5, how many are left?
9. If I take 3 from 4, how many are left?

NOTE. — An excellent device for drills is to make cards with the dots and figures on one side, and the figures only on the other side. The drill should continue until the pupils can tell the combinations instantly when seeing figures only.



NOTE. — Provide splints of these lengths.

1. 2 inches and 1 inch are —— inches.

2. 3 inches and 2 inches are —— inches.

3. 1 inch and 4 inches are —— inches.

4. 2 inches and 2 inches are —— inches.

5. 2 inches cut from a line 4 inches long will leave a line —— inches long.

6. 2 taken from 4 leaves how many?

7. 4 less 2 means that 2 is taken from 4. 4 less 2 are how many?

8. 5 inches less 1 inch are —— inches.

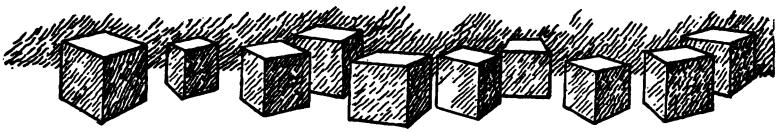
9. 4 inches less 3 inches are —— inch.

10. Mary has a pencil 4 inches long. It will make 2 equal pencils, each —— inches long.

11. John has a pencil 5 inches long. It will make a pencil 2 inches long, and another —— inches long.

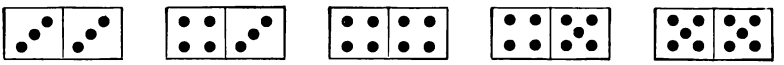
NOTE. — See that pupils understand and can use both expressions, 2 from 4, and 4 less 2.

NOTE. — Have pupils see that in counting they are adding one each time.



1. These are **cubes**. Count them.

2. Put ten cubes into a box and count them as you put them in. How many did you put into the box each time you counted?



six 6 | seven 7 | eight 8 | nine 9 | ten 10

3. Tell how many in each group:

6	4	7	3	8	2	9	5
1	1	1	1	1	1	1	1

NOTE. — Have pupils add these by counting one from the larger. Thus, they should think, "6, 7"; "4, 5"; etc.

4. Henry had 6 cents and earned 1 cent more. How many cents had he then?

5. There were 7 apples on one branch. May picked 1 apple. How many were left?

6. 8 oranges and 1 orange are —— oranges.

7. 5 apples and 1 apple are —— apples.

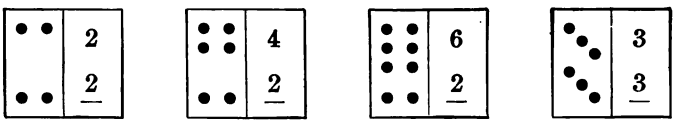
8. Make stories about the cubes in the picture.

1. These children are going to have a birthday dinner. There are to be 4 children at the table. There are 2 spoons at each plate. Count them by 2's, touching 2 spoons each time you count. Say 2, 4, 6, 8.

2. How many are 2 and 2? How many are 4 and 2?

3. Count the children by 2's.

4. Tell how many:

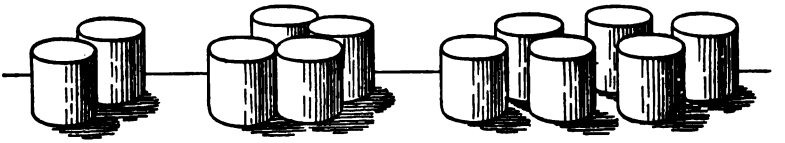


5. There are 2 boys in the picture. How many girls?

6. 4 and 2 are how many? 6 less 2 are how many?

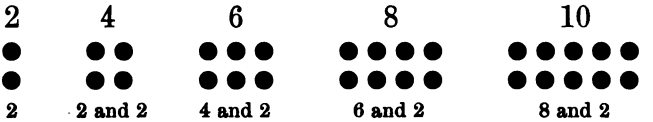
7. Henry, who is carrying the cake, is 2 years younger than his sister. She is 9 years old. How old is Henry?

8. John is 2 years younger than Henry. How old is John?



1. These are **cylinders**. Count them by 2's. As you touch each group say 2, 4, 6.

2. Count rapidly by 2's from 2 to 10. Count from 10 to 2.



3. Tell how many in each group:

2	2	2	2
2	4	6	8

4. If Henry had 2 cents and earned 2 cents more, how many would he then have?

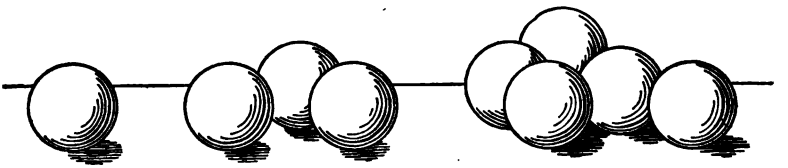
5. Make problems about 2 apples and 4 apples.

6. Make problems about 2 boys and 6 boys.

7. Make problems about 2 inches and 8 inches.

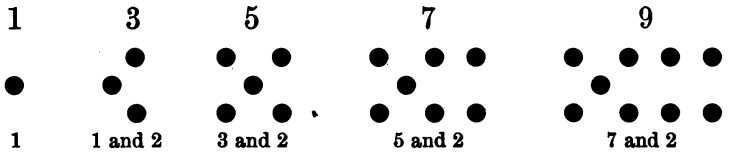
8. Mary had 6 cents and spent 2 cents. How many were left?

9. If you had 8 apples and should give away 2 of them, how many would you then have?



1. These are **spheres**. Count them by 2's. As you touch each group say 1, 3, 5.

2. Count rapidly by 2's from 1 to 9. Count from 9 to 1.



3. Tell how many:

1	3	2	7
2	2	5	2

4. John had 3 cents and earned 2 cents more. He then had —— cents.

5. Mary had 7 cents and spent 2 cents for a pencil. She had —— cents left.

6. Make a problem about 2 apples and 8 apples.

7. Make a problem about 8 inches less 2 inches.

8. If you take 3 spheres away from 5 spheres, how many will be left?

To **add** *two numbers is to put them together to form one number. The number formed is the* **sum.**

3	4	1	5	8	7	1
2	1	6	1	1	1	9

1. When I *add* 2 and 1, I have 3. 3 is the *sum* of —— and ——.

2. Look at the groups above and say, "the sum of 3 and 2 is 5, the sum of 4 and 1 is ——," until you have given the sum of every group.

3. Add quickly:

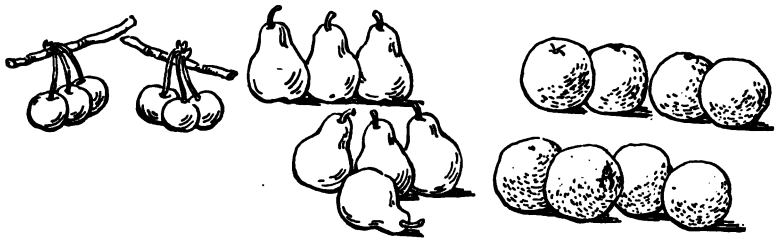
2	3	2	2	2	6	4
2	2	5	8	7	2	2

4. Copy the groups given above and write the sum below each.

5. The number below the line in each group is the *sum.* Tell the missing number to take the place of the star:

3	*	4	2	*	2	*	*
*	2	*	*	4	*	8	7
5	4	5	3	6	7	10	8

*	2	*	*	2	*	7	*
5	*	2	2	*	9	*	6
7	5	6	8	10	10	9	7

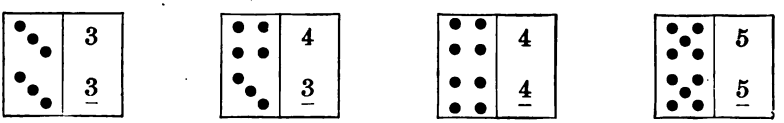


3 and 3 3 and 4 4 and 4

1. How many cherries are 3 cherries and 3 cherries?
2. How many are 3 pears and 4 pears?
3. How many are 4 oranges and 4 oranges?

5 and 5

4. How many are 5 apples and 5 apples?
5. How many 3's in 6? 6. How many 4's in 8?
7. How many 5's in 10?
8. Add:



9. Tell the missing number:

*	*	3	*	4	4	*	3	5
3	3	4	4	*	4	5	3	5
6	7	*	8	7	*	10	*	*

"London Bridge is falling Down!"

1. How many children have their hands joined to form the bridge?

2. How many are there passing under? How many are 2 and 8?

3. How many have passed under? How many more to pass under? Three and 5 are how many?

4. Think what each figure means and add:

3	6	7	6	4
5	2	3	3	5

$4+5=9$ *is a short way to write* 4 *and* 5 *are* 9.

5. Read these:

$4+3=7$	$3+3=6$	$8+2=10$	$3+5=8$
$5+5=10$	$4+5=9$	$3+6=9$	$7+3=10$

"Playing Firemen"

NOTE. — Let the teacher time each pupil as he climbs the ladder by calling the combinations. If he calls one wrong, play that he fell off in going up the ladder. Then let some one else try. Let the one that fell off try again later. Children usually like this game.

1. These children are playing firemen. Which one will get to the top first?

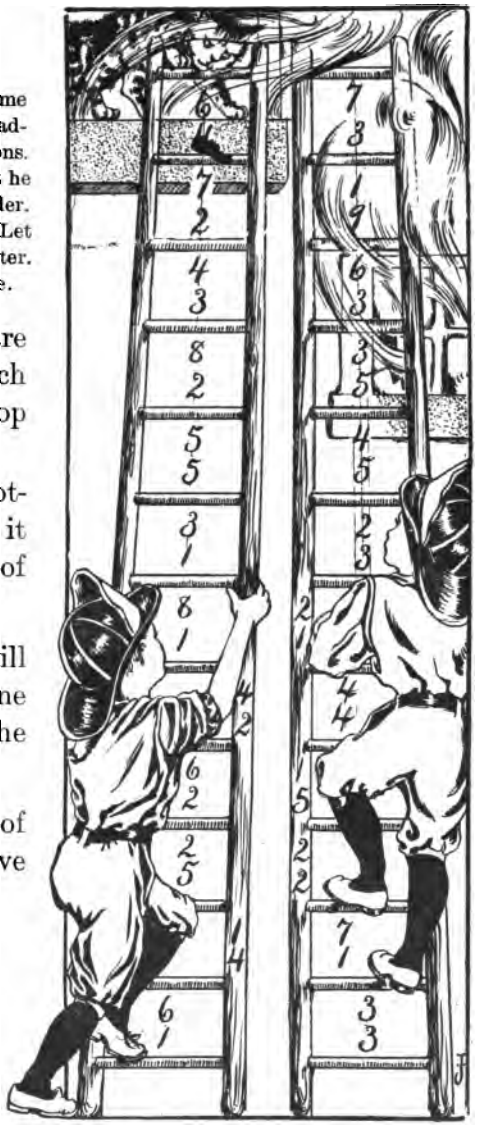
Beginning at the bottom, see how long it takes to go to the top of each ladder.

2. See how long it will take you to run up one ladder and down the other.

3. Make a table of the 25 sums you have learned. Thus

$$2+2=4$$
$$2+3=5$$
$$2+4=6$$

And so on.



"Simon says Thumbs Up"

1. These children are playing a number game. The one standing before the class is showing number cards. The one back of the table is giving the *sums*. When she makes a mistake, all thumbs must turn down. The first one to turn down the thumbs then shows the cards, while the last one to turn thumbs down stands to give the sums. Would you like to play this game?

Learn to give the sums quickly, and then make some cards. They are:

2	6	5	3	2	3	2	4	1	7	3	6
1	3	5	3	6	1	3	4	8	2	5	1
4	5	1	2	5	7	5	3	5	2	8	1
6	1	7	2	4	3	2	4	1	4	2	9

2. Above there are 24 sums to be given. See how quickly you can give them all.

3. Write the 24 sums in this way, $6 + 3 = 9$.

NOTE. — This game may be used in drilling upon any of the combinations. The authors have found it an excellent device.

1. Mary has blown 5 soap bubbles and Henry 4. Together they have blown ——.

2. If Henry and Mary had blown 5 bubbles each, together they would have blown how many?

3. The pipes they are using cost 4 cents each. How much did the two cost?

4. If they gave 8 cents for the pipes, how much change did they get from 10 cents?

5. If Mary has blown 6 bubbles, how many more must she blow to make 10?

6. Henry has blown 9, but 4 have fallen and burst. How many are left?

7. When Henry has blown 8 bubbles, how many more will be needed to make 10?

8. Make problems about 2 bubbles and 6 bubbles.

9. Make problems about 3 cents and 6 cents.

10. Make problems about 8 bubbles less 3 bubbles.

11. Make problems about 4 boys and 5 boys.

12. Make problems about 7 cents less 3 cents.

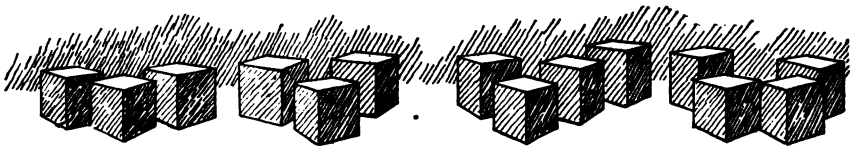
NOTE. — Use drill cards, or some of the games, daily.

"Changing Places"

1. These children are playing a game. They are given numbers not larger than 10. Two children have the same number. The one in the center calls two numbers whose sum is not larger than 10. If she calls 2 and 5, the two children who have the number 7 exchange places. The one in the center tries to get one of the places when they are exchanging. Would you like to play this game? To play it well you must give quickly:

2 and 1	5 and 4	4 and 1	5 and 5	4 and 4
4 and 6	7 and 3	2 and 4	3 and 3	1 and 8
5 and 1	1 and 1	8 and 2	2 and 6	7 and 2
1 and 7	5 and 2	1 and 9	3 and 1	3 and 5
2 and 2	3 and 4	6 and 3	2 and 3	6 and 1

NOTE. — This table gives practice in giving combinations when the figures are not seen in column form. The game furnishes drill in giving sums from hearing the numbers. In drill work appeal to the ear as well as the eye.

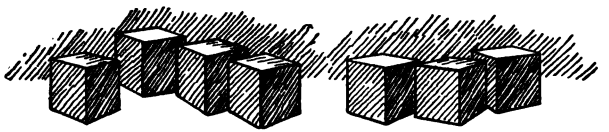


1. If I take three cubes from six cubes, how many cubes have I left?

2. If I take 4 from 8, how many have I left?

3. 2 from 6 leaves how many?

4. 5 from 10 leaves how many?



5. 4 and 3 are how many? Then if I take 3 from 7, how many are left?

6. If I take 4 from 7, how many are left?

7. 6 and 3 are how many? Then 3 from 9 leaves how many? 6 from 9 leaves how many?

8. 9 less 6 are how many?

9. Take 1 from each of the numbers from 2 to 10.

10. Take 2 from each of the numbers from 3 to 10.

11. Take 3 from each of the numbers from 4 to 10.

NOTE. — Show the pupil how subtraction comes from addition. Thus, since 3 and 5 are 8, 3 from 8 must leave 5, and 5 from 8 leaves 3.

1. How many in the sum of each group?

3	5	6	8	3	7	3	4	4	2
4	1	2	1	6	2	5	4	5	4

2. 7 less 4 are how many? 3. 7 less 3 are how many?
4. 8 less 2 are how many? 5. 8 less 6 are how many?

> $10-6=4$ *is read* 10 *less* 6 *are* 4. *This means that* 6 *taken away from* 10 *leaves* 4.

6. Tell how many are left:

$9-6$	$7-6$	$8-5$	$9-8$
$9-3$	$7-2$	$5-4$	$6-3$
$8-3$	$6-3$	$3-1$	$5-2$
$8-6$	$8-2$	$9-2$	$6-5$

7. Take 3 from each of the numbers from 4 to 10.
8. Take 4 from each of the numbers from 5 to 10.
9. Take the lower number from the one above it:

6	5	7	9	8	6	9	6	7	8	9
3	2	1	3	2	2	2	5	2	4	4

10. 3 and how many are 5? 11. 3 and how many are 8?
12. 8 are how many more than 6?
13. 6 are how many more than 4?
14. 7 are how many more than 3?
15. 9 are how many more than 5?

Tell the missing number:

1.	*	1	2	3	*	*	4	*	2
	$\frac{1}{2}$	$\frac{*}{3}$	$\frac{*}{3}$	$\frac{*}{4}$	$\frac{2}{4}$	$\frac{1}{4}$	$\frac{*}{5}$	$\frac{3}{5}$	$\frac{*}{5}$
2.	1	*	3	*	2	1	6	*	1
	$\frac{*}{5}$	$\frac{5}{6}$	$\frac{*}{6}$	$\frac{4}{6}$	$\frac{*}{6}$	$\frac{*}{6}$	$\frac{*}{7}$	$\frac{5}{7}$	$\frac{*}{7}$
3.	5	*	6	*	4	*	1	5	*
	$\frac{*}{7}$	$\frac{4}{7}$	$\frac{*}{7}$	$\frac{7}{8}$	$\frac{*}{8}$	$\frac{3}{8}$	$\frac{*}{8}$	$\frac{*}{8}$	$\frac{6}{8}$
4.	2	2	*	3	4	*	*	6	5
	$\frac{*}{8}$	$\frac{*}{9}$	$\frac{8}{9}$	$\frac{*}{9}$	$\frac{*}{9}$	$\frac{7}{9}$	$\frac{1}{9}$	$\frac{*}{9}$	$\frac{*}{9}$
5.	9	3	*	4	5	*	2	*	1
	$\frac{*}{10}$	$\frac{*}{10}$	$\frac{8}{10}$	$\frac{*}{10}$	$\frac{*}{10}$	$\frac{6}{10}$	$\frac{*}{10}$	$\frac{7}{10}$	$\frac{*}{10}$

NOTE. — Such drills as the one above should be used until pupils can give instantly the 25 combinations that make ten or less.

6. 7 is 3 more than 4; 4 is 3 less than 7.

7. 7 is 2 more than 5; 5 is 2 less than 7.

8. What can you say of

8	6	7	8	9	7	9
5	2	2	2	3	4	5

NOTE. — As the combinations are learned the numbers should be compared by showing differences as in the exercises on this page.

Tell the missing number in these exercises. The numbers above the line were added.

1.	*	3	*	3	*	3	3	4	5
	4	5	6	*	5	6	*	*	*
	8	*	8	7	9	*	8	10	10
2.	7	*	*	5	*	5	*	4	3
	*	6	6	*	6	5	9	*	7
	9	10	9	8	10	*	10	9	*

A Target Game

1. The boys in the picture on the next page are shooting at a target. They agree that each shall shoot, and then the one hitting the larger number shall score the difference. Thus if John hits 9 and Robert 5, John's score is 4.

2. John has hit 9. What will be his score if Robert hits 7? If Robert hits 5? If he hits 6?

3. Robert hit 7. Tell who scores and how much when John hits 10; when he hits 9; when he hits 8.

NOTE. —(1) Make a target on the blackboard. Mark any ring as the first shot. Have pupils tell the score as a second ring is touched.

(2) Suppose John has hit 6. Let the class tell the score as you touch each number from 10 to 2.

Give differences quickly:

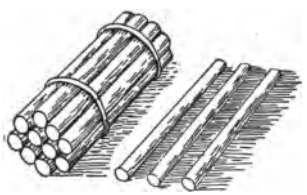
1.	2	5	6	4	9	8	7	10	6
	1	2	3	1	4	3	2	3	5
2.	8	3	9	7	5	10	4	10	8
	2	1	8	5	3	4	2	6	6
3.	5	9	8	6	9	3	10	7	10
	1	2	1	2	3	2	7	6	2
4.	7	6	9	4	10	9	5	10	8
	4	1	6	3	1	1	4	9	7
5.	8	9	7	8	9	6	10	10	7
	5	5	1	4	7	4	8	5	3

1. Count to twenty.

2. You know how to write numbers to ten. The numbers from ten to twenty are written:

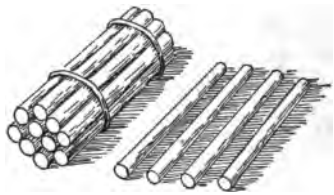
10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20.

10 + 3



13

10 + 4



14

3. *Thirteen* is written 13 and means 1 *ten* and 3 *ones*.

4. *Fourteen* is written 14 and means 1 *ten* and 4 *ones*.

5. Read the numbers written below and tell what each one means.

15 16 17 18 19

6. *Twelve* is written 12 and means 1 *ten* and 2 *ones*.

7. What do you think 11 means?

8. What do we call 4 and 10?

9. What do we call 5 and 10?

10. 10 and 6 are how many?

11. 10 and 7 are how many?

12. 10 and 8 are how many?

13. 10 and 9 are how many?

NOTE. — Pupils should learn the meaning of the names of the different numbers as the "teens," twenty, thirty, etc., for it will aid very much in adding numbers whose sums are more than ten.

NOTE. — Sums greater than 10 need not be found through counting. A new method is shown on pages 21, 22, and 23. The pupil is shown that such sums as 9+8 are found by first taking enough from the smaller number to make 10 when added to the larger; then adding the 10 to the part left from the smaller. Thus 9+8=10+7, or seventeen; 8+6=10+4, or fourteen. The pupil should first see then that "thirteen," "fourteen," etc., are but other names for 3 and 10, 4 and 10, etc.

1. What does thirteen mean? What does fourteen mean?

2. Give another name for each of the following:

5 and 10	2 and 10	7 and 10
3 and 10	6 and 10	9 and 10
4 and 10	8 and 10	1 and 10

3. Give the sums quickly:

10	10	10	10	10	10	10
5	6	8	2	9	7	4

4. Tell how many more are needed to make 10:

9 6 8 7 4 5

5. 9 and 1 and 3 are how many?

6. 8 and 2 and 6 are how many?

7. 7 and 3 and 5 are how many?

8. Add downward:

6	7	6	8	9	8	9	7
4	3	4	2	1	2	1	3
7	5	8	4	6	7	8	8

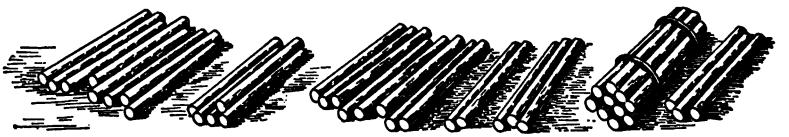
9. 9 and 1 are how many? 9 and 1 and 3 are how many?

10. 5 and 9 is the same as 4 and 1 and 9 or —— teen.

In adding the following, think 9 and 4 make 10 and 3; 9 and 6 make 10 and 5; 8 and 6 make 10 and 4.

1. Add:

9	9	9	9	9	9	8	8
3	6	7	8	2	5	4	6



8 and 5 8 and 2 and 3 10 and 3

2. Which would you choose:

8 apples and 5 apples, 8 apples and 2 apples and 3 apples, or 10 apples and 3 apples?

3. Show how you would add 5 to 8.

4. Show how you would add 7 to 8.

5. Add:

8	8	8	8	8	9	8
5	6	8	7	9	8	3

6. Tell the missing number:

9	9	9	9	9	9	9	9
*	*	*	*	*	*	*	*
14	16	12	17	11	13	15	18

7. James had 8 cents and earned 2 cents one day and 6 cents the next day. He then had —— cents.

1. How many are:

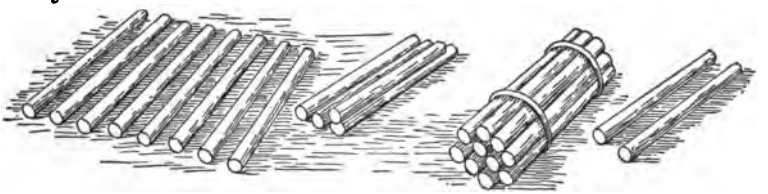
$9 + 1 =$	$9 + 4 =$	$9 + 7 =$
$9 + 2 =$	$9 + 5 =$	$9 + 8 =$
$9 + 3 =$	$9 + 6 =$	$9 + 9 =$

2. Add:

9	9	5	9	8	9	2	1	9
4	3	9	7	9	6	9	9	9

3. 8 and 2 are how many?

4. 8 and 2 and 1 are how many? 8 and 3 are how many?



8 and 4 10 and 2

5. 8 and 4 are the same as 10 and ——.

6. 8 and 5 are the same as 10 and ——.

7. Add:

8	8	8	8	7	4	8	1	9
2	5	3	6	8	8	8	8	8

NOTE. — A classroom test has shown that this method of finding the sums larger than 10 has many advantages.

Pupils thoroughly drilled in the work to page 20 will get the sums quickly, but drill must continue until all combinations can be given automatically.

The game drills and drilling from number cards make the work interesting while securing the required skill.

"Going to Boston"

NOTE. — Play that a second is an hour. When a sum is called incorrectly, the train has had an accident. Encourage the pupil to be a "through flyer," not a "slow freight."

1. This is a double track railroad from Chicago to Boston. Call *C* Chicago and *B* Boston. See how long it will take you to go from Chicago to Boston.

2. How long will it take you to go from Boston to Chicago?

3. Call *D* Detroit. See how long it takes to go from Chicago to Detroit and return.

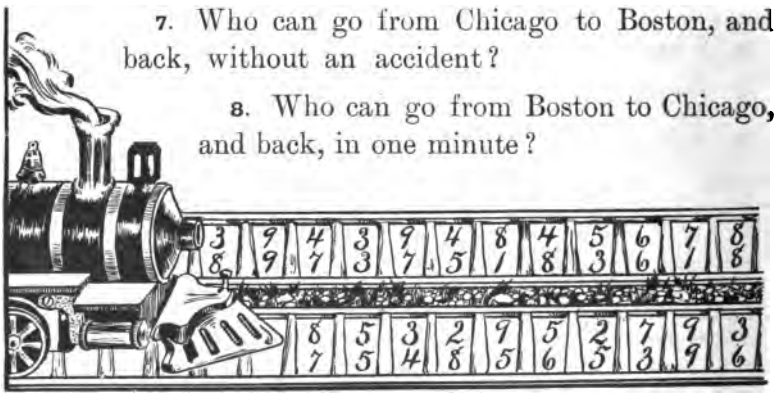
4. How long will it take to go from Detroit to Boston and return?

5. Go from Detroit to Boston and then to Chicago.

6. Go from Detroit to Chicago and then to Boston.

7. Who can go from Chicago to Boston, and back, without an accident?

8. Who can go from Boston to Chicago, and back, in one minute?



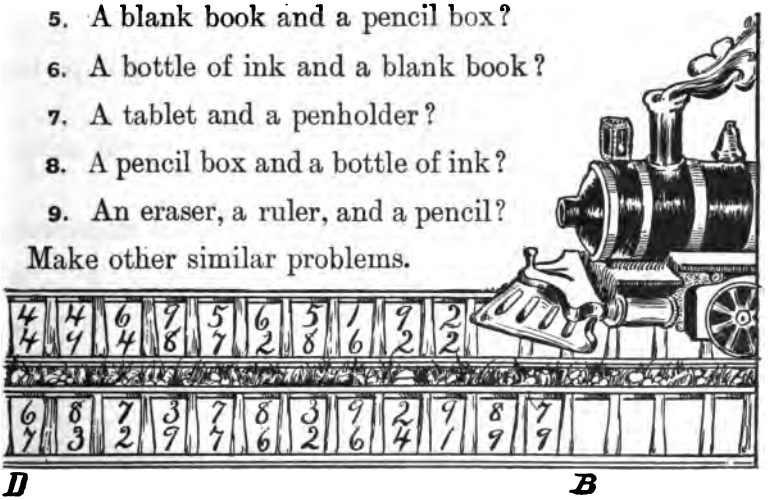
C

SCHOOL SUPPLIES FOR SALE			
Pencils	**4¢**	**Penholders**	**5¢**
Erasers	**2¢**	**Blank Books** . . .	**6¢**
Rulers	**3¢**	**Tablets**	**7¢**
Ink	**8¢**	**Pencil Boxes** . . .	**9¢**

What must you pay if you buy,

1. A pencil and a penholder?
2. An eraser and a tablet?
3. A ruler and a pencil box?
4. A penholder and a bottle of ink?
5. A blank book and a pencil box?
6. A bottle of ink and a blank book?
7. A tablet and a penholder?
8. A pencil box and a bottle of ink?
9. An eraser, a ruler, and a pencil?

Make other similar problems.



A Guessing Game

1. The teacher says, "I am thinking of two numbers whose sum is 9. Guess what they are." She was thinking of one of what four groups?

2. Had she been thinking of two numbers whose sum is 8, name the four groups from which she selected the two numbers.

3. Give two numbers whose sum is shown below the line:

*	*	*	*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*	*	*	*
9	9	9	9	8	8	8	8	7	7	7

4. Name five groups of two numbers whose sums are each 10.

5. Using numbers less than 10, give four groups that make 11. Four groups that make 12.

NOTE. — After playing this game with the teacher "thinking of two numbers," let pupils take turns at asking.

6. Give two numbers less than 10 that make these sums:

*	*	*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*	*	*
16	16	15	15	14	14	14	13	13	13

7. Give quickly all groups of two numbers whose sum is 10. All whose sum is 11. All whose sum is 12.

Practice in Addition

NOTE. — This table contains all of the primary combinations in addition, and should be reviewed very frequently.

	A	B	C	D	E	F	G	H	I	J
1.	1	2	2	3	2	3	1	2	4	5
	1	1	2	1	3	3	4	4	3	1
2.	2	4	6	3	5	6	1	7	8	2
	5	4	1	5	4	2	7	2	1	8
3.	6	5	1	3	6	9	8	7	5	4
	3	5	9	7	4	2	4	5	6	7
4.	9	3	6	6	8	9	9	7	8	2
	5	8	6	9	7	3	8	7	8	9
5.	8	9	6	9	7	5	9	4	6	7
	5	9	8	6	6	8	7	9	9	8

NOTE. — The other drills, as drills from the board and from cards and from games, give variety and should be continued. There is little danger of too much drill.

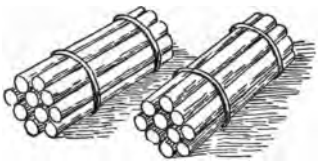
NOTE. — Below are given 60 exercises in subtraction. This table and the addition table on page 27 should be used for drill work almost daily. Work with a time limit to encourage rapidity.

When we take one number from another, we **subtract.**

Subtract:

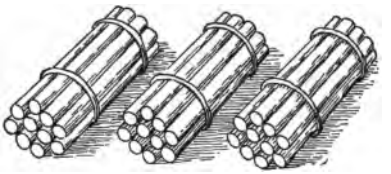
8	6	7	8	7	5	6	7	9	8
5	2	3	6	2	2	4	4	7	3
6	7	8	9	6	9	8	9	9	9
3	5	4	2	2	4	2	3	5	6
10	11	10	12	11	10	12	10	11	12
7	3	8	5	4	6	6	5	7	9
13	11	13	12	13	14	11	12	11	12
4	5	7	8	9	9	6	7	9	4
14	15	16	11	15	13	14	12	13	11
8	9	8	8	6	6	7	3	5	2
13	15	14	16	16	14	15	18	17	17
8	7	6	9	7	5	8	9	9	8

10 + 10



20

10 + 10 + 10



30

1. *Twenty* is written 20 and means *two-tens.*
2. *Thirty* is written 30 and means *three-tens.*
3. Forty is written 40 and means ——.
4. Fifty is written —— and means ——.
5. How do you think you should write

sixty, *seventy*, *eighty*, and *ninety?*

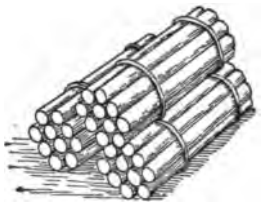
6. Count 10, 20, 30, and so on to 90.
7. *One hundred* is written 100. It means —— tens.
8. *Thirty-five* is written 35 and means 3 *tens* and 5 *ones.*
9. Read 43, 26, 56, 73, 98, 69, 48, 64, 84, 37.
10. What are 6 tens and 2 ones called?
11. How many are:

32	43	56	82	93	81	34	56
3	4	1	5	4	6	1	3

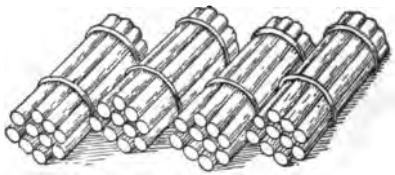
12. How many are:

20	30	40	50	20	20	30	60	40
10	10	10	10	20	30	30	10	20

NOTE. — Give much drill work upon such combinations as are found in exercises 11 and 12.



3 tens or 30



4 tens or 40

1. Add:

3 tens	30	5 tens	50	6 tens	60
4 tens	40	4 tens	40	2 tens	20

2. Subtract:

4 tens	40	7 tens	70	8 tens	80
2 tens	20	3 tens	30	5 tens	50

3. Count by 10's to 90. Now count from 90 by 10's to 10.

4. Add:

20	70	50	20	40	60	50	80
30	20	30	60	40	30	40	10

5. Subtract:

80	70	90	70	80	90	70	80
20	50	30	40	30	50	20	40

6. A bat cost 10 cents and a ball 20 cents. Then both cost —— cents.

7. My knife cost 50 cents and my ball 20 cents. Both cost —— cents. My knife cost —— cents more than my ball.

NOTE. — By adding down, only the last sum will exceed 10; hence these exercises differ but little from the primary combinations. It would be well to make other such drills on the blackboard for sight work. In adding do not allow the pupil to say "4 and 2 are 6, and 1 is 7," but "4, 6, 7." Drill for accuracy and rapidity. Use a time limit.

Add down:

1.	4	5	4	6	7	8	8	5	7
	2	1	3	2	1	1	2	3	3
	1	3	2	3	4	3	4	6	9
2.	8	6	7	6	7	4	6	8	9
	1	4	2	2	2	3	1	2	1
	6	8	3	9	6	8	8	7	6
3.	7	2	6	6	7	8	3	2	4
	3	4	3	4	1	1	4	6	3
	4	9	4	3	9	6	7	8	8
4.	3	5	7	4	5	7	4	3	5
	2	3	2	3	3	1	3	2	2
	4	2	1	2	1	2	2	1	1
	6	8	6	7	6	9	7	6	7

Halves

Fourths

1. If you have an apple, to how many children can you give half of an apple each?

2. If you have one apple, to how many children can you give a fourth of an apple each?

3. If you divide an orange into two equal parts, what part of an orange is each piece?

4. A half of an orange will make how many fourths of an orange?

5. A cake is divided equally among four children. What part of the cake will each have?

6. Mary had 6 cherries and gave Alice half of them. How many did she give Alice? How many did she keep?

7. Harry had 8 pears and gave away half of them. How many did he give away? How many had he left?

NOTE. — Children hear the terms halves and fourths used and should know their meaning about as early as they know the meaning of integral numbers. To these $\frac{1}{3}$ may be added. There are three phases of the use of a fraction, viz: (1) a part of one object; (2) a part of a group of objects; and (3) the relation of one object to another. The first phase is perhaps the most natural. The pupil should think of a fractional unit as a thing.

1. 2 and 2 are how many?
2. 3 and 3 are how many?
3. 4 and 4 are how many?
4. 5 and 5 are how many?
5. How many:

	2	3	4	5
	2	3	4	5

6. How many times did we take each number?
7. 2×2 means that we add two 2's.
8. 2×3 means that we add two 3's.

$2 \times 4 = 8$ *is read* 2 *fours are* 8, *or* 2 *times* 4 *are* 8.

9. $2 \times 2 = ?$ $2 \times 3 = ?$ $2 \times 4 = ?$ $2 \times 5 = ?$

10. When we divide a group into two equal parts, what is each part called?
11. One half of 6 pears is how many pears?
12. One half of 4 cents is how many cents?
13. One half of 8 nuts is how many nuts?
14. One half of 10 cents is how many cents?

NOTE. — The pupil should develop the multiplication tables through addition and thus see that remembering these tables saves time when the addends are all equal. The twos are already known from the primary combinations in addition. The only thing new here is the notation.

1. How many halves in an apple?

2. How many halves in an inch?

3. If you have 4 pieces of candy and give away half of them, how many pieces do you keep?

4. If Lucy has 6 dolls and lets you play with half of them, how many do you have to play with?

5. One half of 8 inches is how many inches?

6. One half of 10 cents is how many cents?

We write "one half of 10 *is* 5" *in another way; thus,* $\frac{1}{2}$ *of* $10 = 5$.

7. Write in a shorter way:

One half of 4 is 2.
One half of 6 is 3.
One half of 8 is 4.
One half of 10 is 5.

8. If we divide 8 things into two equal groups, how many will there be in each group?

$8 \div 2 = 4$, *is read "*8 *divided by* 2 *equals* 4." *It is another way to write* $\frac{1}{2}$ *of* $8 = 4$.

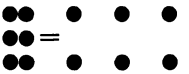
NOTE. — Work in fractions may be objectified by giving pupils exercises on the foot rule.

1. $6 + 6 = ?$

2. Show your teacher another way to write $6 + 6 = 12$.

3. $7 + 7 = ?$	$2 \times 7 = ?$
4. $8 + 8 = ?$	$2 \times 8 = ?$
5. $9 + 9 = ?$	$2 \times 9 = ?$
6. $\frac{1}{2}$ of $12 = ?$	$12 \div 2 = ?$
7. $\frac{1}{2}$ of $14 = ?$	$14 \div 2 = ?$
8. $\frac{1}{2}$ of $16 = ?$	$16 \div 2 = ?$
9. $\frac{1}{2}$ of $18 = ?$	$18 \div 2 = ?$

10. $3 + 3 = 2 + 2 + 2$ $\qquad$ $4 + 4 = 2 + 2 + 2 + 2$



$2 \times 3 = 3 \times 2$ $\qquad$ $2 \times 4 = 4 \times 2$

11. With splints or cubes show that 2 fives are the same as 5 twos.

$$2 \times 5 = 5 \times 2$$

12. 2 threes are equal to —— twos.

13. 2 fours are equal to —— twos.

14. 2 fives are equal to —— twos.

15. $2 \times 6 = 6 \times$ ——. $\qquad$ $2 \times 8 = 8 \times$ ——.

16. $2 \times 7 = 7 \times$ ——. $\qquad$ $2 \times 9 = 9 \times$ ——.

17. If a book costs 16 cents and a tablet half as much, how much does the tablet cost?

NOTE. — Let the pupil see clearly such relations as $2 \times 5 = 5 \times 2$. Also let him see that the first figure is the multiplier; that is, it is a pure abstract number merely denoting the number of addends to be combined.

1. This picture is exactly three inches long. How long do you think the lines of this page are?

2. Do you have a foot rule? Count the numbered spaces

3. What is each numbered space on the foot rule called?

4. How many inches in 1 foot?

12 inches make 1 foot
12 in = 1 ft.

5. Measure a yardstick with your foot rule. How many feet in 1 yard?

3 feet make 1 yard
3 ft. = 1 yd.

6. How much more than a yard is 4 feet?

7. How many feet in 2 yards?

8. How much less than 2 yards is 5 feet?

9. If 12 inches should be cut off from a yard stick, how many feet would be left?

10. How tall is Tom if he is a yardstick and a foot rule in height?

1. Four inches and 3 inches are how many inches?

2. How many are 5 inches and 4 inches?

3. Five inches and 7 inches are —— inches, or just one ——.

4. 2 feet and 1 foot are how many feet? What else is this called?

5.	6.	7.	8.
2 inches	4 feet	3 yards	4 feet
3 inches	5 feet	2 yards	6 feet
4 inches	2 feet	6 yards	5 feet

9. How much less than a foot is 10 inches?

10. How much more than a foot is 14 inches?

11. 8 inches and how much more make a foot?

12. What else may you call 6 inches and 6 inches?

13. Give another name to the following:

8 inches and 4 inches	1 inch and 11 inches
5 inches and 7 inches	3 inches and 9 inches
10 inches and 2 inches	6 inches and 6 inches

14. Give in inches:

1 foot less 8 inches	1 foot less 10 inches
1 foot less 5 inches	1 foot less 7 inches
1 foot less 6 inches	1 foot less 4 inches

15. Draw lines on the blackboard showing the size of the page of a book 5 inches wide and 8 inches long.

NOTE. — Either real or toy money should be actually handled by the pupils.

1. James has 3 cents and John has 8 cents. How many cents have both?

2. If you spend 6 cents for a pencil and 10 cents for a book, how much do you spend in all?

3. If you buy a 3-cent pencil and give the clerk a dime, how much change will he give you?

Five cents make one nickel
Ten cents make one dime

4. How much more than a dime are

6 cents and 7 cents? 9 cents and 8 cents?
8 cents and 4 cents? 8 cents and 6 cents?

5. If I buy a 2-cent pencil and a 5-cent tablet, how much change shall I get back from a dime?

6. How much change shall I get back if I buy 2 oranges at 4 cents each and give the clerk a dime?

7. How many nickels are 3 dimes worth?

8. I have 20 cents and spend a dime. How much have I left? How many nickels is it worth?

9. Mary had two dimes and spent a nickel. How much had she left?

10. After school Harry earned a dime and a nickel. How many cents was that?

11. Lucy bought a pencil for 2 cents and a tablet for 5 cents. How much change will she receive from a dime?

"Playing Store"

1. These children are in a store. They have "make-believe" money. The teacher is storekeeper. Ruth has just bought an eraser for 3 cents. She gave the storekeeper a nickel. What change should she receive?

2. Henry bought a book for 7 cents. He gave the storekeeper a dime. What change should he receive?

3. Mary bought a pencil for 5 cents and some colored crayon for 8 cents. She gave the storekeeper a dime and a nickel. What change should she receive?

4. Robert bought a paper-weight for 8 cents and gave the storekeeper the exact change. What pieces of money did he give her?

NOTE. — This game has proved to be a very valuable and very interesting exercise. After pupils have learned to buy and make change with teacher as storekeeper, let one or more pupils be the storekeeper and the rest buy of them. If real or toy money is not at hand, let the pupils make from cardboard *cents*, *nickels*, and *dimes*.

The smallest coin that we use is the **cent.**

A **nickel** = 5 cents.	A **quarter** of a dollar = 25 cents.
A **dime** = 10 cents.	A **half dollar** = 50 cents.
A **dollar** = 100 cents.	\$ means *dollars*; ¢ means *cents.*

When we write dollars and cents together, we put a *period* called a **decimal point** between them. Thus:

\$3.25 is read 3 dollars and 25 cents.

1. Read: \$1.25; \$1.50; \$2.75; \$3.24; \$4.50; \$6.95; \$0.75; \$0.68.

2. We may write 5 cents another way, it is \$0.05. Ten cents may be written 10¢ or \$0.10. (The zero shows that there are no dollars.) Write 7 cents in two ways; write 15 cents in two ways.

3. \$1.05 is read 1 dollar and 5 cents. Read \$3.08; \$5.80; \$0.75; \$0.60; \$0.06; \$3.60; \$3.06.

4. 2 nickels equal how many cents?

5. 15 cents equal how many nickels?

6. Alice gave the clerk 2 dimes to pay for a writing tablet costing 12 cents. How much change did he give her?

7. When I give the clerk a quarter to pay for 17 cents worth of meat, how much change shall I get back?

8. If from a quarter the clerk takes pay for a writing book costing a dime and a pencil costing a nickel, how much change shall I get?

1. Fill a pint measure with water. Empty it into a quart measure. Do this until you fill the quart measure.

2. How many pints does it take to make a quart?

3. A quart of sand will fill how many pint measures?

4. A pint is what part of a quart?

2 pints (pt.) = **1 quart** (qt.)
1 pint (pt.) = **one half of a quart**

5. How many pints in two quarts?

6. 6 pints are how many quarts?

7. If a quart of milk costs 6 cents, how much will a pint cost?

8. If a pint of nuts costs 5 cents, how much will a quart cost?

9. Mary and Ruth each gathered a quart of berries. How many pints did each gather? How many pints did both gather?

10. At 3 cents a pint, how much will a quart cost?

11. At 5 cents a pint, how much will a quart and a pint of nuts cost?

NOTE. — While there is a little difference between the quart used in measuring liquids and the one used in measuring nuts or berries, it need not be brought out now.

1. Lucile bought 2 yards of ribbon for her doll. She paid 6 cents a yard. How much did she pay? How much more than a dime did she pay?

2. How many inches in 1 foot and 6 inches?

3. 6 inches is what part of a foot?

4. At 5 cents a pint, what will a quart of milk cost?

5. At 8 cents a quart, what will a pint of milk cost?

6. Charles has 2 dimes. How much less than a quarter has he?

7. 3 dimes are how much more than a quarter?

8. James bought some marbles for 12 cents and a 5-cent top. How much change should he receive if he gave the clerk 2 dimes?

9. At 18 cents a yard, how much will $\frac{1}{2}$ yard of ribbon cost?

10. At 16 cents a quart, how much will a pint of nuts cost?

11. If Henry feeds his chickens a pint of corn every day, how long will 5 quarts last?

12. If you step 20 inches, how much more than a foot do you step? How much less than 2 feet?

13. How many pint bags may be filled from 2 quarts of peanuts?

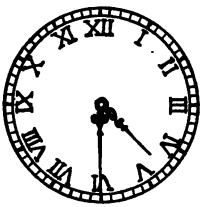
14. If cream is 32 cents a quart, how much is that for a pint?

15. 12 pints are how many quarts?

We have another way of writing numbers. You have seen numbers written this way on a clock face. The numbers on a clock face are:

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1	2	3	4	5	6	7	8	9	10	11	12

When the long hand on the clock dial points to XII, the clock strikes the hour pointed to by the short hand.



1. What time is it when the long hand is at XII and the short one points to III? Tell what hour it is when the long hand is at XII and the other at VI.

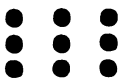
2. Leave the long hand at XII and move the short hand to each of the other numbers, telling the time at each one.

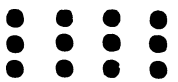
3. In an hour the long hand moves once around the circle, but the short hand moves only from one number to the next one. How long will it take the long hand to move from XII to VI?

4. When the long hand is at VI, it is half past some hour. What time is it when the long hand is at VI and the short hand between IV and V?

5. Leave the long hand at VI and tell what time it is when the short hand is between II and III; between III and IV; between V and VI; between VI and VII.

NOTE. — This page is to teach the Roman numerals to XII and how to read time to hours and to half hours. Use a clock dial.





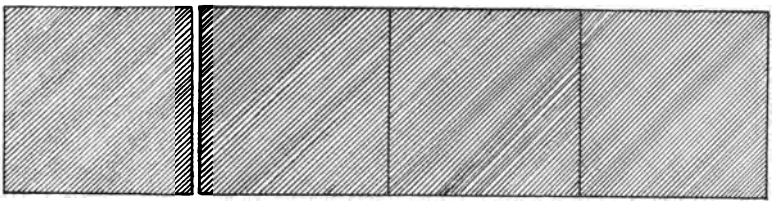
1. $3+3+3=$? $3+3+3+3=$?
2. How many threes in the first group of dots?
3. How many threes in the second group of dots?
4. How many fours in the second group?
5. $3\times 3=$? $3\times 4=$? $4\times 3=$? $3\times 5=$? $5\times 3=$?

If you divide anything into three equal parts, each part is **one third** *of the thing.*

6. How many acorns in the whole group?
7. How many acorns in *one third* of the group?
8. One third of 9 acorns is —— acorns.

$\frac{1}{3}$ *of* $9=3$. *This is read "one third of* 9 *is* 3."

9. $\frac{1}{3}$ of $6=$ ——. $\frac{1}{3}$ of $12=$ ——. $\frac{1}{3}$ of $15=$ ——.
10. When 3 pears cost 9 cents, how much will one cost?
11. When 3 pints of milk cost 12 cents, how much will 1 pint cost?



A square inch An oblong one inch wide and three inches long

1. How many square inches can you make from the oblong?

2. How many oblongs like this one could you make from an oblong 2 inches wide and 3 inches long?

3. How many square inches in an oblong 2 inches wide and 3 inches long?

4. Draw a three-inch square on your paper.

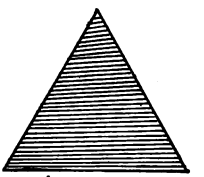
5. Divide the square you have made into oblongs 1 inch wide and 3 inches long. How many oblongs does it make?

6. How many square inches will each oblong make?

7. How many square inches will the 3-inch square make?

8. A triangle has three sides. If each side of a triangle is 2 inches long, how far is it around it?

9. If each side of a triangle is 5 feet long, how far is it around it?



A triangle

NOTE. — The measurement of oblongs gives concrete work in multiplication. Each rectangle should be accurately constructed and divided into oblongs 1 inch wide, and at least one of the rectangles should be divided into square inches.

1.

6	7	8	9
6	7	8	9
6	7	8	9

2. $3 \times 6 = ?$ $3 \times 7 = ?$ $3 \times 8 = ?$ $3 \times 9 = ?$

3. $6 \times 3 = ?$ $7 \times 3 = ?$ $8 \times 3 = ?$ $9 \times 3 = ?$

4. Mary colored 6 Easter eggs for each of 3 little girls. How many did she color for all three girls?

5. There are 7 days in one week. How many days in 3 weeks?

6. If a newspaper costs 8 cents a week, how much will it cost for 3 weeks?

7. If a boy earns 9 cents each morning delivering papers, how much will he earn in 3 mornings?

8. Alice feeds her pony 3 quarts of oats a day. How many quarts does she feed it in a week?

9. Harry has 12 apples. How many can he give to each of 3 boys?

10. Lucy gathered 3 quarts of nuts. The whole party gathered 8 times as many. How many did all gather?

11. There are 3 feet in a yard. How many feet are there in 8 yards?

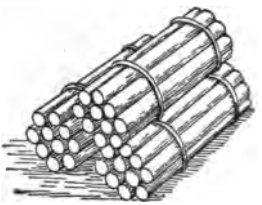
12. Tell how many:

$\frac{1}{3}$ of 18	$18 \div 3$	$\frac{1}{3}$ of 24	$24 \div 3$
$\frac{1}{3}$ of 21	$21 \div 3$	$\frac{1}{3}$ of 27	$27 \div 3$

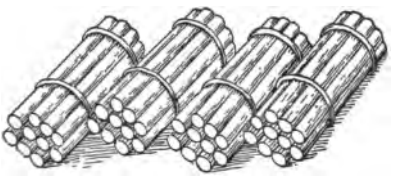
PRIMARY ARITHMETIC

PART TWO: THIRD YEAR

READING AND WRITING NUMBERS



3 tens or 30



4 tens or 40

1. How many *tens* in *thirty?*
2. How many *tens* in *forty?*
3. *Two tens* are called what?
4. *Five tens* are called what?
5. *Eight tens* are called what?
6. Count by tens from 10 to 90.
7. Write in figures:

twenty	*forty*	*sixty*	*eighty*
thirty	*fifty*	*seventy*	*ninety*

Ten tens are written 100 and are called **one hundred.**

1. 245 is read "two hundred, forty-five."

> *When we use three figures to express a number, the one at the left shows how many* **hundred** *there are.*

2. 563 is read 5 hundred, 63.

3. 308 is read 3 hundred, 8. 4. 600 is read 6 hundred.

5. Read:

324	843	784	709	900
693	235	379	407	800

> **Zero** *is written* 0 *and means* **not any**.

In 600 the 6 means 6 *hundred* and the 0's show that there are no *tens* and no *ones*.

725 means 7 hundred, 2 tens, and 5 ones. 805 means 8 hundred, no tens, and 5 ones.

6. What does each figure of 720 mean?

7. Write in figures:

two hundred, forty-seven	*nine hundred, six*
six hundred, fifty-three	*seven hundred, four*
seven hundred, sixty	*six hundred, seven*

> *Do not use* **and** *in reading whole numbers.*

100 or 10 tens

10 or 10 ones

1

1. How many *ones* in 2 *tens?* In 3 *tens?*
2. How many are 3 *tens* and 5 *ones?*
3. How many are 4 *tens* and 7 *ones?* 5 *tens* and 6 *ones?*
4. How many *tens* and how many *ones* in:

33	75	86	67	42
44	84	43	53	53
55	63	28	81	35
66	97	42	96	27

5. How many *tens* in 2 *hundred?* In 4 *hundred?*
6. How many *hundreds*, *tens*, and *ones* in:

333	347	784	396	999
444	68	968	587	888
726	196	634	602	700

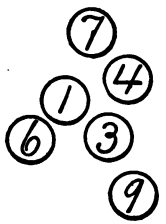
7. Write in figures:

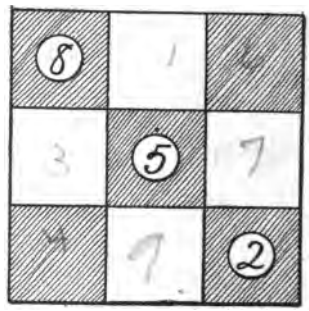
3 *hundred*, 4 *tens*, and 6 *ones*. 6 *hundred* and 7 *ones*.
8 *hundred*, 6 *tens*, and 7 *ones*. 7 *hundred* and 3 *tens*.
9 *hundred*, 8 *tens*, and 2 *ones*. 8 *hundred* and 6 *ones*.
6 *hundred*, 7 *tens*, and 5 *ones*. 2 *hundred* and 0 *ones*.
5 *hundred*, 0 *tens*, and 0 *ones*. 6 *hundred* and 3 *ones*.

1. *At sight give the sums of four numbers.*

5	8	4	9	4	6	8	2	7	8	9
2	2	5	5	4	6	8	7	9	3	3
4	2	7	8	3	9	7	5	6	2	6
3	9	4	5	6	9	5	6	8	6	7
3	3	6	5	7	6	5	4	7	9	4
3	7	9	5	8	4	3	9	7	8	8

2. Charles has a number game that he can play alone. He made a square and divided it into 9 small squares. He cut the numbers from 1 to 9 from a calendar, and pasted them upon some checkers.





The game is to place all 9 figures upon the squares so that the sum of three numbers in any row is 15. Would you like to make such a game and play it at home?

NOTE. — Such a game will furnish an interesting home game. In trying to arrange the numbers upon the board, there is much practice in adding 2 and 3 numbers.

NOTE. — Work like the following must be thoroughly mastered before column addition can be well done.

1. How many are 20 and 3? 30 and 6? 70 and 8?

2. Add:

60	70	40	70	90	80	50
8	9	3	6	7	4	5

3. How many are 18 and 1? 22 and 3? 42 and 4?

4. Add:

21	43	61	83	96	46	54
7	2	4	2	2	3	2

65	73	46	86	91	75	86
2	4	3	2	4	3	2

5. Beginning with 17, count 5 more. Then 17 and 5 are 22. So 27 and 5 are 32. 37 and 5 are 42.

6. How many are 47 and 5? 57 and 5? 67 and 5? 77 and 5?

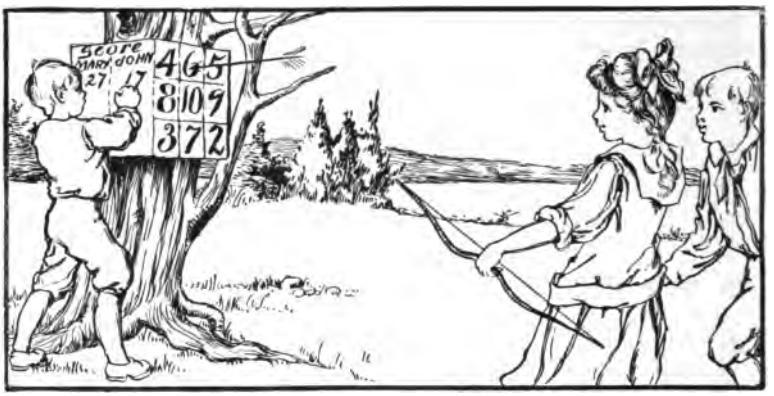
7. Beginning with 18, count 6 more. Then how many are 18 and 6? How many are 28 and 6? 38 and 6?

8. Add:

48	58	68	78	88	98
6	6	6	6	6	6

9. Add:

15	25	35	45	55	65	75	85
7	7	7	7	7	7	7	7



1. John's score is 17. What will it be if he hits 5? 6? 8? 9? 4? 7? 2? 3?

2. If Mary has already a score of 27, what will she have when she makes any one of the following:

4 5 6 7 8 9

NOTE. — Make such a target upon the blackboard. Starting with any score above 10, have pupils tell the score when any number is touched. Encourage rapid work.

3. *Add:*

3	6	4	9	8	9	8	5	6	7
9	8	7	6	7	6	8	5	6	7
4	3	8	4	6	5	7	5	6	7
—	—	—	—	—	—	—	—	—	—

5. In what other way did you know the sums of the last three columns, without adding?

1. Harry has made a number game like the one below. Each player throws 3 one-inch cubes, and scores the sum of the numbers upon which the cubes fall.

Give the score when the cubes fall upon:

2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
3	3	7	8	9	8	9	9	8	8
4	3	6	8	3	8	4	9	7	7
6	9	8	7	8	5	4	4	6	7

12. As your teacher touches any three of the numbers, give the score quickly. (Use a blackboard picture.)

13. As your teacher touches one square twice, and any third square, give the score. Give it as she touches any square 3 times.

NOTE. — Encourage number games like this that can be played at home. The making of the game board may be a part of the assigned work in "industrial arts." The game may be varied to secure drill of various kinds.

Bill of Fare in the Lunch Room of the Washington School

Milk	3¢	Chicken Sandwich . .	8¢
Cocoa	4¢	Beef Sandwich . . .	7¢
Soup	6¢	Lettuce Sandwich . .	4¢
Baked Beans . . .	5¢	Bread and Butter . .	5¢
Creamed Potatoes .	6¢	Sliced Tomatoes . . .	6¢

1. What will your lunch cost if you take milk and bread and butter?

2. If you take a chicken sandwich, sliced tomatoes, and cocoa?

3. If you take a beef sandwich, soup, and milk?

4. If you take cocoa, creamed potatoes, and a lettuce sandwich?

5. If you take baked beans, bread and butter, and milk?

6. Select any two things that will not cost more than 10 cents, and then any third one you would like, and give the cost.

7. Select any three things you would like for lunch, and tell the cost.

8. Select 3 things for a lunch that will cost $0.13.

9. What is the smallest sum for which you could get any 4 of these articles for lunch?

NOTE TO THE TEACHER. — Give similar exercises from other bills. Encourage rapid, accurate work.

NOTE. — Daily drill from this or similar tables should be continued until the sums of any number of one order and one of two orders can be given automatically. This is imperative for successful column addition. Fix time limits occasionally.

A	41	37	45	92	69	84	11	38	75	52
	1	7	7	4	9	5	6	9	9	7
B	94	67	31	83	42	95	63	81	44	39
	4	2	2	4	3	6	5	7	8	2
C	75	92	37	86	61	36	84	92	46	73
	8	2	8	6	3	8	6	8	9	7
D	63	56	13	81	35	42	98	63	81	49
	3	7	9	4	5	6	8	8	8	3
E	37	41	28	14	63	57	32	81	48	14
	3	5	5	7	6	9	9	9	3	9
F	12	35	15	65	38	55	34	53	74	63
	5	8	9	8	1	5	9	3	7	7
G	64	26	26	15	45	33	49	62	92	49
	7	4	6	7	6	4	8	9	6	6

1. Frank had 28 quarts of nuts, and gathered 7 quarts more. How many quarts did he then have?

2. Frances had 37 cents in her bank, and put in 9 cents more. How many cents did she then have in her bank?

3. George had 2 dimes and a nickel. He earned 8 cents more. How much did he then have?

4. Sydney's knife cost 45 cents and his marbles cost 8 cents. How much did both cost?

5. Grace gathered 48 sweet peas and 7 roses. How many flowers did she gather in all?

6. Donald caught 8 trout, and his father caught 17. How many trout did both catch?

7. Mary's mother bought 9 quarts more milk this month than last month. She bought 37 quarts last month. How many quarts did she buy this month?

8. George weighs 67 pounds. Harry weighs 6 pounds more. How much does Harry weigh?

9. Howard's pony cost $75 and his saddle cost $9. How much did both cost?

10. Gladys wrote 14 words and misspelled 5. How many did she have right?

11. Henry will be 16 years old in 7 years. How old is he now?

12. Peter's score in shooting was 6, 7, 2. Frank's was 8, 3, 5. Which beat, and by how much?

1. Lucile has 46 picture postal cards from the United States and 9 from England. How many postal cards has she?

2. Charles has read 87 pages of his new book and has 8 pages more to read. How many pages in the book?

3. Margaret spent 85 cents for a doll and 9 cents for some ribbon. How much did she spend for both?

4. Mary's mother spent $56 for a dress and $8 for a hat. How much did both cost?

5. In one yard there are 36 inches. How many inches in 1 yard 7 inches? In 1 yard and 5 inches? In 1 yard and 8 inches?

6. There are 32 quarts in a bushel. How many quarts in 1 bushel and 7 quarts? In 1 bushel and 8 quarts? In 1 bushel and 9 quarts?

7. There are 64 pints in 8 gallons. How many pints in 8 gallons and 5 pints?

8. Henry is 58 inches tall, and his father is 9 inches taller than he. How tall is Henry's father?

9. Eliza paid 5¢ for walnuts, 7¢ for pecans, and 8¢ for almonds. How much did she pay for all the nuts?

10. Annie's fare was 8¢ and her brother's half as much. What did both pay?

11. Fred sold a mess of corn from his garden for 7¢ and a head of lettuce for 5¢. How much change must he give back if the purchaser offers him a dime and a nickel?

1. *Add:*

A	B	C	D	E	F	G	H	I	J	K
3	6	7	8	6	7	8	6	7	4	8
7	9	4	9	4	5	4	5	8	3	7
8	3	6	7	9	6	7	9	6	9	4
—	—	—	—	—	—	—	—	—	—	—

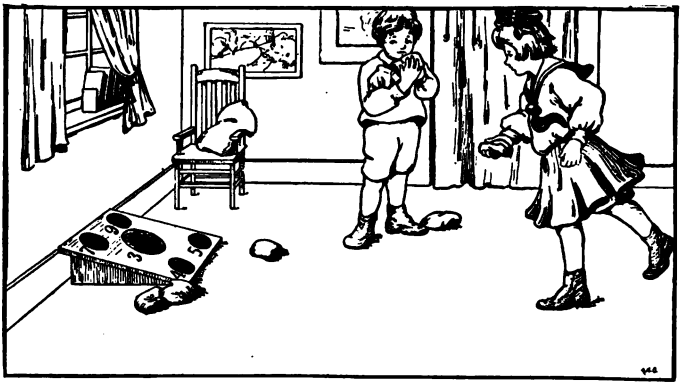
2. *Add:*

2	1	8	7	8	3	7	3	3	5	2
4	9	7	3	4	6	2	3	9	7	1
6	7	5	9	8	3	8	9	6	8	9
8	3	2	6	6	8	3	3	4	6	6
—	—	—	—	—	—	—	—	—	—	—

3. *Copy and add:*

4	5	7	8	6	7	7	6	5	3	4
3	3	2	1	2	2	3	7	4	8	3
6	7	3	3	3	4	2	8	6	2	2
4	6	6	4	5	6	4	2	7	6	4
—	—	—	—	—	—	—	—	—	—	—
6	5	6	7	8	8	9	2	7	8	6
4	4	4	3	3	4	6	7	9	3	7
3	3	3	4	9	2	2	6	6	9	8
6	5	2	5	5	6	3	5	1	2	3
—	—	—	—	—	—	—	—	—	—	—

NOTE. — From the blackboard give much sight work in adding such columns.



Find the total score for each game and tell who won.

1.

Mary	3	0	9	7	0	0	3	0	4	5	3	0	4
James	7	4	0	3	0	3	5	0	0	3	3	4	3

2.

Mary	0	3	5	4	3	4	9	0	7	3	0	0	3
James	9	0	3	5	4	9	0	3	0	0	3	3	4

3.

Mary	0	5	5	9	0	7	5	3	0	5	7	9	5
James	5	7	7	9	3	0	0	3	5	5	4	3	4

4.

Mary	4	4	7	3	9	0	0	7	0	3	4	9	4
James	0	9	5	4	5	7	0	5	4	3	0	7	3

5.

Mary	5	3	9	0	7	9	0	3	3	7	0	3	9
James	0	9	7	3	5	3	7	3	0	9	3	0	7

6.

Mary	7	3	7	0	4	5	3	0	9	7	3	4	4
James	9	7	0	4	0	3	9	0	7	3	9	0	5

1. How much will 8 pencils cost at 2 cents each? How much will they cost at 3 cents each?

2. How much will 7 pears cost at 3 cents each?

3. How much will 9 two-cent stamps cost?

4. How many pints in 6 quarts?

5. How many nickels in 7 dimes?

6. How many feet in 8 yards?

7. When apples are 2 cents each, how much will 8 apples cost?

8. How many cents in 2 dimes? In 3 dimes?

9. *Give quickly:*

2	3	4	5	6	7	8	9	10
2	3	4	5	6	7	8	9	10

10. *Give quickly:*

2	3	4	5	6	7	8	9	10
2	3	4	5	6	7	8	9	10
2	3	4	5	6	7	8	9	10

Table of 2's and 3's

$2 \times 1 = 2$	$2 \times 6 = 12$	$3 \times 1 = 3$	$3 \times 6 = 18$
$2 \times 2 = 4$	$2 \times 7 = 14$	$3 \times 2 = 6$	$3 \times 7 = 21$
$2 \times 3 = 6$	$2 \times 8 = 16$	$3 \times 3 = 9$	$3 \times 8 = 24$
$2 \times 4 = 8$	$2 \times 9 = 18$	$3 \times 4 = 12$	$3 \times 9 = 27$
$2 \times 5 = 10$	$2 \times 10 = 20$	$3 \times 5 = 15$	$3 \times 10 = 30$

1. At 2 cents each, how many pencils can you buy for a dime?

2. At 3 cents each, how many peaches can you buy for 6 cents? How many for 9 cents? How many for 12 cents?

3. At 2 cents each, how many picture postal cards can you buy for 8 cents? How many for 10 cents? How many for 12 cents? How many for 14 cents?

4. How many two-cent stamps can you buy for 16 cents? How many for 18 cents? How many for 20 cents?

5. How many quarts in 6 pints? In 8 pints? In 16 pints? In 20 pints?

6. How many yards in 6 feet? In 9 feet? In 12 feet?

7. In 15 feet how many yards? In 27 feet?

8. Give quickly:

$4 \div 2$	$10 \div 2$	$14 \div 2$	$6 \div 3$	$9 \div 3$	$15 \div 3$
$6 \div 2$	$20 \div 2$	$12 \div 2$	$12 \div 3$	$18 \div 3$	$27 \div 3$
$8 \div 2$	$16 \div 2$	$18 \div 2$	$21 \div 3$	$24 \div 3$	$30 \div 3$

Table of 2's and 3's

$2 \div 2 = 1$	$12 \div 2 = 6$	$3 \div 3 = 1$	$18 \div 3 = 6$
$4 \div 2 = 2$	$14 \div 2 = 7$	$6 \div 3 = 2$	$21 \div 3 = 7$
$6 \div 2 = 3$	$16 \div 2 = 8$	$9 \div 3 = 3$	$24 \div 3 = 8$
$8 \div 2 = 4$	$18 \div 2 = 9$	$12 \div 3 = 4$	$27 \div 3 = 9$
$10 \div 2 = 5$	$20 \div 2 = 10$	$15 \div 3 = 5$	$30 \div 3 = 10$

1. How many:

4	5	6	7	8	9
4	5	6	7	8	9
4	5	6	7	8	9
4	5	6	7	8	9

2. $4 \times 4 = ?$ $4 \times 5 = ?$ $5 \times 4 = ?$ $4 \times 6 = ?$ $6 \times 4 = ?$

3. $4 \times 7 = ?$ $7 \times 4 = ?$ $4 \times 8 = ?$ $8 \times 4 = ?$ $9 \times 4 = ?$

When we multiply one number by another, the result is the **product.**

4. Give the products quickly:

3	5	4	3	9	8	4	9	2	5
4	3	6	7	2	3	2	3	7	4
3	2	9	2	4	2	6	4	6	2
3	3	4	5	7	2	3	8	2	8

5. $4 \div 2 = ?$ $6 \div 2 = ?$ $6 \div 3 = ?$ $9 \div 3 = ?$

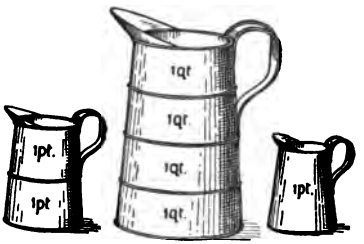
When we divide one number by another, the result is the **quotient.**

6. Give the quotients quickly:

$8 \div 2$	$15 \div 3$	$12 \div 4$	$21 \div 3$	$20 \div 4$
$10 \div 2$	$12 \div 3$	$18 \div 3$	$16 \div 4$	$24 \div 3$

Pints, Quarts, and Gallons

NOTE. — Pints and quarts have been studied. To these the gallon is added. Supply the class with actual measures. Sand is more convenient than water.



1. How many pints in a quart? A pint is what part of a quart? At 5 cents a pint, how much will 2 quarts of milk cost?

2. Using a quart measure to carry the sand, fill a gallon measure. How many quarts does it take?

2 pints make 1 quart
4 quarts make 1 gallon
2 pt. = 1 qt.
4 qt. = 1 gal.

3. How many quarts in 2 gallons? In 3 gallons?

4. Copy and fill the blanks:

2 gal. = —— qt.	7 gal. = —— qt.	5 gal. = —— qt.
3 gal. = —— qt.	9 gal. = —— qt.	8 gal. = —— qt.
4 gal. = —— qt.	6 gal. = —— qt.	10 gal. = —— qt.

5. How many quart bottles of milk can a milkman fill from a can holding 5 gallons? From one holding 8 gallons? From one holding 10 gallons?

1. At 10 cents a quart, what will a pint of milk cost?

2. At 32 cents a gallon, what will a quart of vinegar cost?

3. Some children kept a lemonade stand at a fair. They had large glasses that held 1 pint each. If they sold 2 gallons, how many glasses did they sell? If they sold 3 gallons, how many glasses did they sell? How many glasses in 4 gallons?

4. A dairyman sold 40 quarts of milk to a family in one month. How many gallons was this?

5. Tell how many gallons in

8 quarts	20 quarts	24 quarts	28 quarts
16 quarts	12 quarts	32 quarts	36 quarts

6. There are 4 quarters in $1. How many quarters in $2? In $3? In $8? In $5?

7. Tell how many quarters in

$4	$6	$7	$9	$10

8. How many dollars in 8 quarters? In 12 quarters? In 16 quarters?

9. Tell how many dollars in

20 quarters	40 quarters	24 quarters
32 quarters	28 quarters	36 quarters

10. How much change would you receive from a 5-dollar bill if you paid 12 quarters for your purchase?

Dry Measure

Some grains, fruits, and vegetables are measured by the **quart**, **peck**, or **bushel.** Have you ever seen these measures?

8 quarts make 1 peck
4 pecks make 1 bushel
8 qt. = 1 pk.
4 pk. = 1 bu.

1. How many quarts in 2 pecks? How many quarts in 4 pecks or 1 bushel?

2. Henry gathered 12 quarts of nuts. How much more than a peck did he gather?

3. How many quarts in $\frac{1}{2}$ bushel or 2 pecks?

4. If Howard gives his pony 2 quarts of oats at a feed, how many feeds in $\frac{1}{2}$ a bushel?

5. If I feed my horse a peck of oats a day, how long will 6 bushels last? How long will 10 bushels last?

6. A farmer sold the apples from a single tree for $20. If there were 40 pecks, how much did he get for a bushel?

7. I can buy cooking apples for 30 cents a peck, or for a dollar a bushel. Which is the cheaper?

8. How many quarts in a bushel?

1. If Mary gives her pet rabbit 3 carrots each day, how many will she give him in a week or 7 days?

2. How many will she give him in 5 days? In 6 days? In 8 days? In 4 days? In 9 days?

3. If she feeds the rabbit 2 carrots each day, how long will 8 last? How long will 12 last? How long will 16 last? How long will 18 last?

4. If she feeds him 3 each day, how long will 9 last? How long will 12 last? How long will 21 last? How long will 27 last? How long will 15 last? How long will 24 last?

5. Give the quotients:

$6 \div 3$	$12 \div 3$	$14 \div 2$	$8 \div 2$	$10 \div 2$
$9 \div 3$	$12 \div 2$	$16 \div 2$	$21 \div 3$	$18 \div 2$
$6 \div 2$	$15 \div 3$	$18 \div 3$	$27 \div 3$	$24 \div 3$

6. If a boy earns 3 dimes each week, how many will he earn in 3 weeks? In 5 weeks? In 8 weeks? In 9 weeks? In 7 weeks? In 6 weeks?

7. If Alice feeds her pet squirrel 6 nuts each meal, how many will she feed him in 2 meals? In 3 meals? In 4 meals?

8. If she feeds him 6 nuts each meal, how many meals will 18 make? How many meals will 24 make? How many will 12 make?

1. George feeds his hens 4 pints of corn each morning. How many pints will he feed them in a week (7 days)?

2. How long will 12 pints last? How long will 16 pints last?

3. How many pints will he feed in 5 days? In 4 days? In 8 days? In 3 days? In 9 days?

4. At 4 pints each day, how long will 20 pints last? How long will 32 pints last? How long will 36 pints last?

5. At 6 pints each day, how many pints would he feed in 3 days? In 4 days? In 2 days?

6. At 5 pints a day, how long will 15 pints last? How long will 20 pints last?

7. If each hen weighs 5 pounds, what will 4 hens weigh? What will 3 hens weigh?

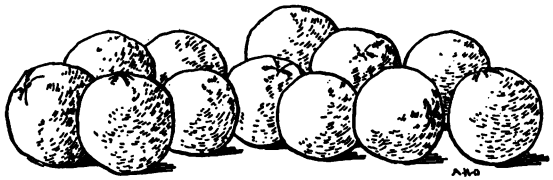
8. If the feed costs 6 cents a day, what will it cost for 3 days? For 4 days? For 2 days?

Table of 4's

$4 \times 1 = 4$	$4 \times 6 = 24$	$4 \div 4 = 1$	$24 \div 4 = 6$
$4 \times 2 = 8$	$4 \times 7 = 28$	$8 \div 4 = 2$	$28 \div 4 = 7$
$4 \times 3 = 12$	$4 \times 8 = 32$	$12 \div 4 = 3$	$32 \div 4 = 8$
$4 \times 4 = 16$	$4 \times 9 = 36$	$16 \div 4 = 4$	$36 \div 4 = 9$
$4 \times 5 = 20$	$4 \times 10 = 40$	$20 \div 4 = 5$	$40 \div 4 = 10$

1. Can you name some things that are sold by the dozen?

2. How many things make a dozen?



12 things make a dozen.
12 = 1 doz.

3. How many in half a dozen? In one fourth of a dozen?

4. At 20 cents a dozen, how much will 6 peaches cost?

5. At 40 cents a dozen, what will 3 oranges cost?

6. If you buy papers at 9 cents a dozen and sell them for 1 cent each, how much do you make on a dozen?

7. If you buy a dozen oranges and give away 4, how many have you left?

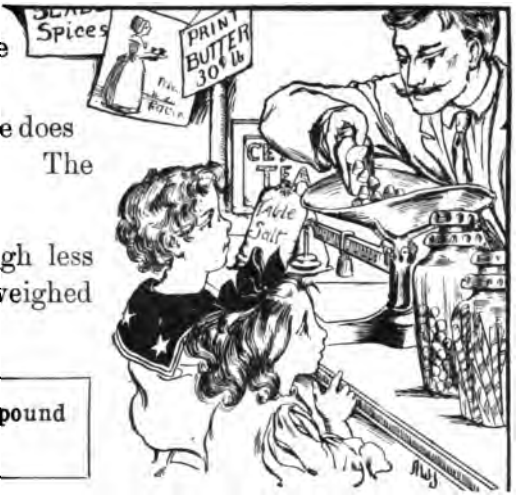
8. What will half a dozen eggs cost at 2 cents each?

9. At 5 cents each, how much will one fourth of a dozen pears cost?

10. At 6 cents each, what will one fourth of a dozen oranges cost?

1. Name some things bought by the pound.

2. What measure does the butcher use? The grocer?



Articles that weigh less than a pound are weighed by the **ounce**.

16 ounces make 1 pound
16 oz. = 1 lb.

3. How many ounces in $\frac{1}{2}$ pound of butter?

4. How many ounces in $\frac{1}{4}$ pound of pepper?

5. At 20 cents a pound how much is 8 oz. of butter worth?

6. At 24 cents a pound, how much is 1 lb. and 4 oz. of steak worth?

7. How many 2-oz. packages of spices can be made from 1 lb.?

8. When chocolate candy is worth 40 cents a pound, how much will 4 ounces cost?

9. At 20 cents a pound, how many ounces of candy can you get for a dime? How much for a nickel?

10. At 20 cents a pound, how much will 12 oz. (8 oz. and 4 oz.) of candy cost?

1. How many:

5	6	7	8	9
5	6	7	8	9
5	6	7	8	9
5	6	7	8	9
5	6	7	8	9

2. $5 \times 5 = ?$ $5 \times 6 = ?$ $5 \times 7 = ?$ $5 \times 8 = ?$ $5 \times 9 = ?$

3. $6 \times 5 = ?$ $7 \times 5 = ?$ $8 \times 5 = ?$ $9 \times 5 = ?$

4. Give the products quickly:

5	7	9	3	5	5	2	5
6	5	5	5	8	4	5	5

NOTE. — Let the pupil see that the number of tens in each product is half of the number that is taken 5 times, and that if 1 remains, the product ends in 5. When the table is formed, merely point out that this is so, as it will aid in remembering the table of 5's.

5. Count by fives. Say 5, 10, 15, and so on to 50.

6. At 5 cents each, how much will 7 oranges cost?

7. At 5 cents a quart, how much will 9 quarts of milk cost?

8. Henry spent 25 cents for pears at 5 cents each. How many did he buy?

9. If I paid 5 cents each for 6 car rides to-day, how much did I spend for car rides?

10. Give quotients quickly:

$25 \div 5$	$35 \div 5$	$45 \div 5$	$30 \div 5$	$40 \div 5$
$\frac{1}{5}$ of 25	$\frac{1}{5}$ of 35	$\frac{1}{5}$ of 45	$\frac{1}{5}$ of 30	$\frac{1}{5}$ of 40

1. How much did you pay for your pencil?

2. How much will 5 pencils cost at this price? How much will 4 cost?

3. How much does your mother pay for a quart of milk? How many quarts does she buy in one day? How much does it cost at this price?

4. If milk is 5 cents a quart, how much will a quart each day for a week cost?

5. When strawberries are 9 cents a quart, how many quarts can I buy for 18 cents? How many quarts for 27 cents?

6. At 5 cents a pint, how much will 2 quarts of nuts cost?

7. At 5 cents a yard, how much will 8 yards of braid cost?

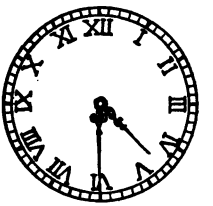
8. When 3 oranges cost 15 cents, how much is that apiece? At this price, how much will 7 cost?

9. Mary has a garden, and sold 8 dozen carrots to-day for 5 cents a dozen. How much did she get for them?

Table of 5's

$5 \times 1 = 5$	$5 \times 6 = 30$	$5 \div 5 = 1$	$30 \div 5 = 6$
$5 \times 2 = 10$	$5 \times 7 = 35$	$10 \div 5 = 2$	$35 \div 5 = 7$
$5 \times 3 = 15$	$5 \times 8 = 40$	$15 \div 5 = 3$	$40 \div 5 = 8$
$5 \times 4 = 20$	$5 \times 9 = 45$	$20 \div 5 = 4$	$45 \div 5 = 9$
$5 \times 5 = 25$	$5 \times 10 = 50$	$25 \div 5 = 5$	$50 \div 5 = 10$

1. The figures on a clock face usually are the **Roman Numerals**. Show how to make them from 1 to 12.



2. It takes the long hand of a clock 5 minutes to go from one number to the next. How long does it take for it to go from XII to II? From XII to III?

3. When it is exactly 3 o'clock, where is the long hand? Where is the short hand?

4. Starting with the long hand at XII and the short hand at IX, give the time as the long hand moves to I, II, III, on around to XII again.

5. As your teacher points to the figures on the clock face count the minutes past any hour.

6. Count around a clock face as in Exercise 5 and find how many minutes in 1 hour.

60 minutes make 1 hour
60 min. = 1 hr.
24 hours make 1 day
24 hr. = 1 da.

7. You should sleep $\frac{1}{3}$ of your time and 2 hours more each day. How many hours should you sleep each day?

8. If you go to bed at 8 o'clock, when should you get up?

CHOCOLATE CARAMELS	CREAM CANDY
3 lb. brown sugar	Whites of 4 eggs
$\frac{1}{4}$ lb. butter	6 tablespoonfuls cold water
$\frac{1}{2}$ lb. grated chocolate	4 lb. granulated sugar
1 pt. cream or milk	$\frac{1}{4}$ lb. nuts
$\frac{1}{2}$ lb. granulated sugar	Vanilla flavor
Vanilla flavor	

1. Some children made chocolate caramels and cream candy from these receipts. For the caramels, the brown sugar costs 5¢ a pound. How much did the 3 pounds cost?

2. At 28¢ a pound, how much did the butter for the caramels cost?

3. Chocolate costs 40¢ a pound. How much did the chocolate cost?

4. They used milk in the caramels that cost 8¢ a quart. How much did the milk cost?

5. At 6¢ a pound, how much did the granulated sugar cost?

6. They cooled the caramels in two pans each 8 inches long and 5 inches wide. If they cut the caramels into pieces 1 inch square, how many caramels will they have in each pan? How many in both pans?

7. For the cream candy, the eggs cost 24¢ a dozen, the sugar 6¢ a pound, and the nuts 36¢ a pound. Find the cost of the cream candy.

1. How many inches in a foot? $\frac{1}{2}$ of a foot is how many inches?

2. $\frac{1}{2}$ ft. = —— in.; $\frac{1}{3}$ ft. = —— in.; $\frac{1}{4}$ ft. = —— in.

3. How many feet in 1 yard? A foot is what part of a yard?

4. Tell how many yards in each of the following:
6 ft.; 12 ft.; 9 ft.; 15 ft.; 21 ft.; 18 ft.

5. When ribbon is 24 cents a yard, how much is 1 foot worth?

6. Mary bought 4 ft. of ribbon at 15 cents a yard. How much did it cost?

7. Frank made 6-inch badges from 8 feet of ribbon. How many did he make?

8. How many quart bottles of milk can a dealer fill from a gallon of milk? How many from 2 gallons? From 3 gallons? From 4 gallons? From 5 gallons?

9. Give the number of quarts in 7 gallons; in 8 gallons; in 9 gallons; in 10 gallons.

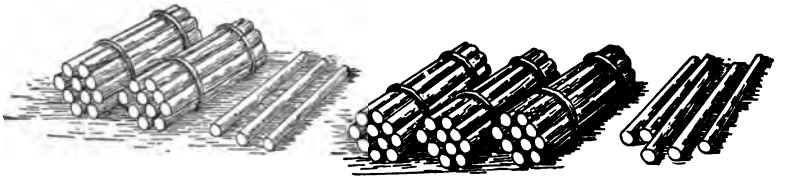
10. How many times can you fill a peck measure from 1 bushel of oats? From 5 bushels? From 10 bushels?

11. How many ounces in $\frac{1}{2}$ pound? In $\frac{1}{4}$ pound?

12. How many things in $\frac{1}{2}$ dozen? In $\frac{1}{4}$ dozen?

13. At 40 cents a dozen, how much will $\frac{1}{2}$ dozen oranges cost?

NOTE. — Make or have the pupils propose additional similar problems regarding the materials used in work in textiles, bookbinding, or box making.



2 *tens* and 3 *ones* 3 *tens* and 5 *ones*

$$\begin{array}{r} 23 \\ 35 \\ \hline 58 \end{array}$$

NOTE. — As this work is done on the board by the teacher, have the pupils count the splints, adding the *ones* and the *tens*. No "carrying" is yet introduced.

Add:

1. $\begin{array}{r} 43 \\ +24 \\ \hline \end{array}$	2. $\begin{array}{r} 16 \\ +42 \\ \hline \end{array}$	3. $\begin{array}{r} 19 \\ +60 \\ \hline \end{array}$	4. $\begin{array}{r} 17 \\ +42 \\ \hline \end{array}$	5. $\begin{array}{r} 24 \\ +71 \\ \hline \end{array}$
6. $\begin{array}{r} 22 \\ +74 \\ \hline \end{array}$	7. $\begin{array}{r} 43 \\ +26 \\ \hline \end{array}$	8. $\begin{array}{r} 81 \\ +17 \\ \hline \end{array}$	9. $\begin{array}{r} 63 \\ +25 \\ \hline \end{array}$	10. $\begin{array}{r} 12 \\ +76 \\ \hline \end{array}$

11. There are 38 people in one street car and 41 in another. How many in both cars?

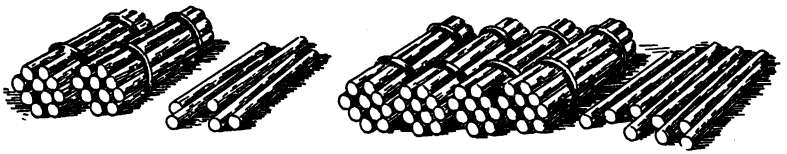
12. My book cost 32 cents and my slate cost 16 cents. Both cost how many cents?

13. If I pay 20 cents for a ball and 25 cents for a catching glove, how much do I pay for both?

14. Charles has 23 marbles and James has 14. How many have both?

15. Mary spent 25 cents for a doll and 12 cents for some ribbon. How much did she spend in all?

2 tens and 5 ones + 4 tens and 8 ones



25 + 48

1. How many ones in all? How many tens in all?
2. 13 ones are how many more than ten?
3. Then there are 3 ones and how many tens in all?

25
48
13
60
73

EXPLANATION OF WORK. — There are 13 ones or 1 ten and 3 ones. There are also 6 tens or 60 ones. So in all there are 7 tens and 3 ones, or 73.

4. Add 36 and 29; add 48 and 39; add 56 and 37.

WORK	WORK	WORK
36	48	56
29	39	37
15	17	13
50	70	80
65	87	93

NOTE. — Use splints to show the adding in Exercise 4.

5. Add:

48	29	38	57	39
36	37	48	38	28
73	78	67	48	56
19	19	94	79	79

1. Add:

$$\begin{array}{r} 46 \\ 87 \\ \underline{13} \\ 120 \\ \underline{13} \\ 133 \end{array}$$

2. What is the sum of 6 and 7?
3. 13 is —— ten and —— ones.
4. What other tens are to be added?
5. In all how many tens?

NOTE. — Lead the pupil to see that by writing the 3 only of the 13 and adding the 1 to 8 before adding the 4 we have $1 + 8 + 4$ as the number of tens, which saves work.

6. Tell how we added these:

28	47	36	49	55
39	28	18	13	38
67	75	54	62	93

7. Add:

43	64	53	24	38
29	28	28	19	17
67	77	83	86	76
58	46	49	98	98
284	362	186	238	329
392	485	493	146	165
187	165	423	368	285
349	387	198	197	169

NOTE. — In this first abridged work in addition use care that the pupil sees that he is simply doing what he did before without writing so many figures.

Add:

1. 36 48	2. 72 49	3. 86 97	4. 96 88	5. 76 89	6. 94 76
7. 42 79 43	8. 73 86 44	9. 82 37 65	10. 94 43 68	11. 86 63 96	12. 76 94 74
13. 34 28 31	14. 84 62 34	15. 28 16 51	16. 72 26 24	17. 73 47 56	
18. 92 36 84 25	19. 27 82 31 62	20. 23 21 78 43	21. 34 67 12 63	22. 26 91 78 24	

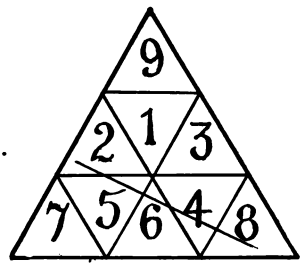
23. Write in columns and add 96, 34, 28, 91; also 46, 24, 81, 75.

24. In a school there are 85 pupils in the first grade, 73 in the second, 69 in the third, and 58 in the fourth. How many are there in all?

25. Mary helped her father plant bulbs. They planted 96 tulips, 84 snowdrops, 72 daffodils, and 65 hyacinths. How many bulbs did they plant?

26. Find the sum of 43, 74, 86, 95.

Charles and Evelyn have made a game like this one from a piece of cardboard. With the edge of a card, they touch 3, 4, or 5 of the small triangles and have as score the sum of the numbers upon the triangles. The line shows the card cutting 2, 5, 6, 4, and 8. So the score is 25.



1. Place the card so as to touch just *three* of the small triangles. What is your score?
2. If the score for five trials was as follows, which won?

   Charles: 15, 14, 13, 15, 15.
   Evelyn: 16, 13, 18, 12, 16.

3. Touch just *four* triangles and give the score.
4. Keep the score of five trials and add them.
5. Give the score when *five* triangles are touched.
6. Keep the score of five trials and add them.

NOTE. — Such games, played at home will furnish a motive for drill.

1. *Add:* The *sum* here is 1 *thousand*, 724.

$$\begin{array}{r} 896 \\ 547 \\ 381 \\ \hline 1724 \end{array}$$

A figure in the fourth place at the left of ones stands for **thousands.**

2. *Tell what the separate figures stand for in:*

4625	3847	9645	8391	1648	5840
1196	2346	4267	6893	5908	2803

3. Read each of the numbers given above.

Write in figures:

4. Five thousand, three hundred fifty-six.
5. One thousand, three hundred thirty-eight.
6. Nine thousand, five hundred eighty-one.

Add and read results:

7.	8.	9.	10.	11.	12.
329	649	832	964	821	832
921	468	327	496	827	375
932	583	673	230	714	436
847	891	739	846	218	794

13.	14.	15.	16.	17.	18.
892	273	523	345	426	576
136	824	621	678	291	381
784	317	378	124	478	496
625	621	243	639	324	783

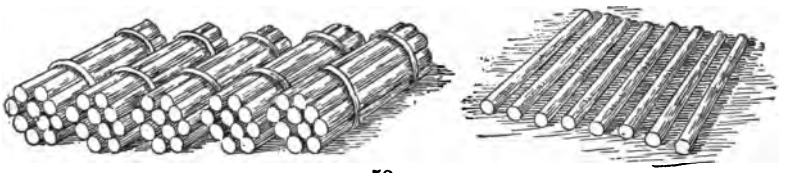
Add:

1.	2.	3.	4.	5.
246	963	879	922	368
398	487	631	138	91
56	329	47	467	476
271	86	232	83	87

6.	7.	8.	9.	10.
37	862	19	684	306
269	129	864	721	897
342	37	57	63	56
83	640	261	48	380
162	28	73	54	49

Write in columns and add:

11. 483 + 361 + 493.
12. 634 + 86 + 198.
13. 96 + 108 + 969.
14. 365 + 810 + 74.
15. 967 + 84 + 377.
16. 346 + 934 + 83.
17. 863 + 397 + 19.
18. 37 + 390 + 846.
19. 543 + 357 + 96.
20. 684 + 733 + 309.
21. 434 + 281 + 79.
22. 643 + 71 + 386.
23. 87 + 46 + 387 + 962 + 59.
24. 138 + 264 + 93 + 167 + 84.
25. 232 + 95 + 86 + 342 + 861
26. 298 + 743 + 54 + 117 + 938.
27. 675 + 84 + 47 + 398 + 264.
28. 392 + 847 + 36 + 281 + 96.



58
5 tens and 8 ones

From 58 subtract 23.

WORK

$$\begin{array}{r} 58 \\ 23 \\ \hline 35 \end{array}$$

EXPLANATION OF WORK. — From 5 *tens* and 8 *ones* we are to take 2 *tens* and 3 *ones*. Three ones from 8 ones leave how many ones? Two tens from 5 tens leave how many tens?

NOTE. — Make the work concrete by using splints as shown above. Another method coming into use is to think of the number which added to the subtrahend gives the minuend. Thus, 3 and 5 are 8; 2 and 3 are 5.

Subtract, taking the ones from the ones first, and then the tens from the tens:

1. 68	2. 96	3. 86	4. 78	5. 63
23	43	24	27	41
6. 98	7. 89	8. 64	9. 96	10. 57
73	37	23	81	23
11. 46	12. 92	13. 49	14. 84	15. 46
25	31	26	31	35

16. A pony cost 85 dollars and a saddle cost 14 dollars. The pony cost how much more than the saddle?

17. A boy earned 64 cents on Friday and 96 cents on Saturday. How much more did he earn on Saturday than on Friday?

Subtract:

1.	13	23	53	43	73	83	12	22	42	62
	9	9	9	9	9	9	8	8	8	8
2.	92	32	15	25	45	65	55	75	16	26
	8	8	9	9	9	9	9	9	8	8
3.	56	76	36	46	14	24	34	84	54	74
	8	8	8	8	5	5	5	5	5	5
4.	15	25	75	45	35	95	17	27	47	67
	7	7	7	7	7	7	8	8	8	8
5.	57	87	16	26	56	46	96	76	12	22
	8	8	7	7	7	7	7	7	7	7
6.	62	92	42	62	13	23	43	73	93	63
	7	7	7	7	4	4	4	4	4	4

NOTE. — Continue drills of this kind until pupils are expert.

1. Subtracting the numbers in one column at a time, find the difference:

369	487	573	693	789
126	236	241	341	526

2. Subtract 37 from 65.

	WORK	
65	50 + 15	EXPLANATION OF WORK. — Here we could not take 7 from 5, so we took 1 of the 6 tens and put with the 5 ones before subtracting, and said 7 ones from 15 ones, 8 ones; 3 tens from 5 tens, 2 tens.
37	30 + 7	
	20 + 8	
	or, 28	

NOTE. — Use splints to represent the minuend. Avoid the use of the term "borrow," as it has no real meaning.

While the method given above is the one in most general use, the Austrian method is coming into use and is perhaps the quicker. In using this method we think 7 and 8 are 15; 1 ten (from the 15) and 3 tens and 2 tens are 6 tens. Teach the method that seems preferable, but not both.

Subtract:

3.	4.	5.	6.	7.	8.
87	96	46	86	73	86
29	48	29	27	48	21

9.	10.	11.	12.	13.	14.
342	583	692	873	832	743
126	247	426	529	518	526

15.	16.	17.	18.	19.	20.
526	619	738	926	427	618
183	483	485	781	183	296

1. A pony can be bought for $65. A boy now has $42. How much more will he need to buy the pony?

2. If a pony costs $65 and a cart costs $18 less, how much does the cart cost?

3. A yard is 36 inches. Charles is 52 inches tall. How much more than a yard is that?

4. It is 179 miles from Chicago to Moline and 358 miles to Des Moines. How much farther from Chicago is Des Moines than Moline?

Subtract:

5.	6.	7.	8.	9.	10.
647	876	943	842	365	474
556	692	552	391	184	292

11. 564 − 372.
12. 981 − 468.
13. 283 − 85.
14. 945 − 639.
15. 632 − 521.
16. 785 − 318.
17. 841 − 649.
18. 3412 − 516.
19. 6421 − 827.
20. 1283 − 349.
21. 6832 − 684.
22. 951 − 327.

23.	24.	25.	26.	27.
3496	7162	8472	9116	7261
1873	1539	2968	1843	4839

28. There are 653 pupils in two schools. If there are 286 in one, how many in the other?

29. A boy earns $18 per month and his father earns $95. How much more does the father earn than the son?

Table for Daily Drill

Add the numbers from 1 *to* 9 *inclusive to each number in the following table. Add by columns and by rows.*

	A	B	C	D	E	F	G	H	I
1.	13	64	50	90	85	48	89	54	25
2.	74	91	33	20	63	16	72	78	10
3.	38	19	79	39	34	67	40	24	53
4.	56	32	92	14	57	26	35	88	43
5.	37	81	49	93	36	52	17	23	77
6.	51	15	96	59	27	83	65	99	68
7.	31	61	69	29	95	21	94	42	84
8.	70	87	28	98	18	41	55	80	75
9.	58	60	97	46	82	62	22	12	66
10.	47	11	71	30	86	73	45	76	44

Subtract all the numbers from 1 *to* 9 *inclusive from each number in the table. Subtract by columns and by rows.*

Subtract:

1. 3463 − 1946

2. 5128 − 2963

3. 6481 − 3927

4. 7392 − 5786

Add:

1.	2.	3.	4.	5.
64	83	35	48	74
86	96	76	57	86
92	28	98	96	98
47	34	43	87	24
25	22	76	24	39

6.	7.	8.	9.
763	175	736	342
284	628	281	796
976	931	197	381
831	763	648	428
427	247	234	155

10. $345+268+417+365+761+843$.
11. $126+847+964+327+842+365$.
12. $343+284+963+783+175+486$.

Subtract:

13.	14.	15.	16.	17.
847	936	381	817	927
726	193	196	628	185

18.	19.	20.	21.
3465	5684	7285	8347
1723	1936	1937	5629

22. $3847-1926$	26. $1482-736$	30. $3429-2918$
23. $1835-924$	27. $1196-987$	31. $2736-1928$
24. $1936-1384$	28. $1542-839$	32. $3684-2839$
25. $1285-839$	29. $1684-976$	33. $3251-2764$

The Daily News sells for 1¢, the Daily Tribune for 2¢, and the Saturday Evening Post for 5¢.

1. Tom sells in one day 4 Posts, 8 copies of the Tribune, and 12 copies of the News. What does he receive in all?

2. Harold sells 3 Posts, 9 copies of the Tribune, and 9 copies of the News. What does he receive in all?

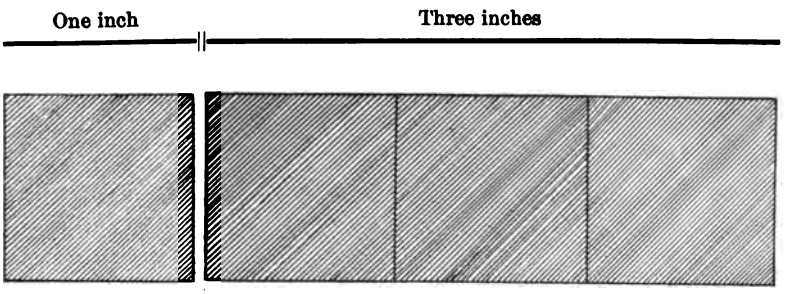
3. Robert sells 6 Posts, 5 copies of the Tribune, and 10 copies of the News. What does he receive in all?

4. How much more does Robert receive on that day than Harold? How much more than Tom?

5. On another day Tom sells 7 Saturday Evening Posts, Harold sells 6, and Robert sells 8. How much does each receive? How much do all of them receive?

6. On another day Tom sells 9 copies of the Tribune and 9 of the News. Harold sells 8 copies of the Tribune and 12 of the News. And Robert sells 7 copies of the Tribune and 15 of the News. How much does each receive? How much do all of them receive?

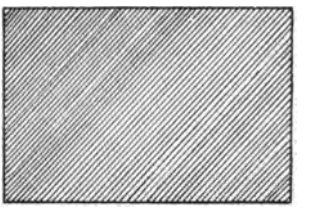
7. On one day Harold earned 38¢. He spent 10¢ for street car fare and 14¢ for lunch. How much did he spend in all? How much did he save?



1. We measure the *length* of anything by a *line* an *inch* long, a *foot* long, or a *yard* long.

We measure a surface, as the top of a desk, or the wall or floor of a room, by a **square surface**, as a **square inch**, a **square foot**, or a **square yard**.

2. A diagram like the one at the right, which is longer than it is wide, is an **oblong**. How long is the oblong at the top of the page? How wide? How many square inches in it? Form an oblong with 4 square inches.


An oblong

3. From square inches cut from cardboard form a square with 4 square inches. How long is it?

4. Form an oblong 2 inches wide and 4 inches long. How many square inches are used?

5. Make an oblong that will contain 12 square inches.

Draw oblongs to represent some of the following:

1. How many square inches will it take to make an oblong 3 inches wide and 6 inches long? 3 inches wide and 8 inches long?

2. If an oblong is made from 15 square inches and is 3 inches wide, how long is it? If it is 3 inches wide and contains 18 square inches, how long is it?

3. I have 21 squares an inch long. How long an oblong can I make if it is to be 3 inches wide?

4. If I have 8 one-inch squares, I can make an oblong 2 inches wide and 4 inches long, or one inch wide and —— inches long.

5. Tell three kinds of oblongs that you can make from 12 one-inch squares.

6. An oblong 4 inches wide contains 20 square inches. How long is it?

7. An oblong 8 inches long contains 32 square inches. How wide is it?

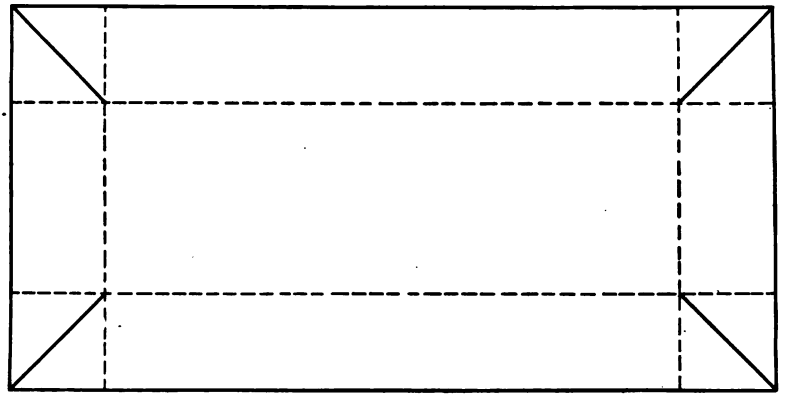
8. A square contains 9 square inches. How long is one side?

9. A square contains 16 square inches. How long is one side?

10. Make as many oblongs as you can from 18 one-inch squares.

11. Make as many oblongs as you can from 24 one-inch squares.

12. An oblong 4 in. by 10 in. contains —— sq. in.



1. This is a pattern for a box without a cover. How long is it? How wide is it? How many square inches of paper does it take?

2. Draw such a pattern. Cut along heavy lines. Fold along dotted lines. How long, how wide, and how deep is the box?

3. Draw a pattern for a box 3 inches long, 2 inches wide, and 1 inch deep. How long is the pattern? How wide is it? How many square inches of paper did it take to make the box?

4. How many square inches of paper are needed to make a box 5 inches long, 3 inches wide, and 1 inch deep?

5. A box is 4 inches square and 1 inch deep. What is the shape and the length of the pattern?

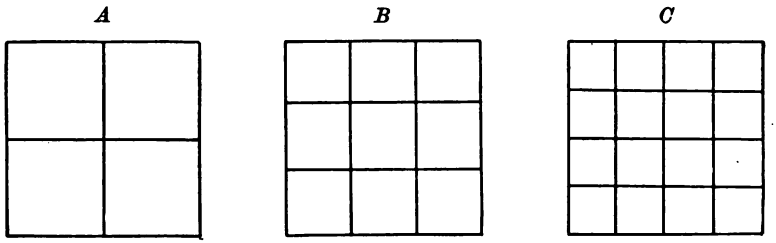
6. Make the drawing for a box 6 inches long, 2 inches wide, and 2 inches deep. Make the box.

1. How long and wide is your tablet?

2. Can you draw a square 2 inches long on it? One 4 inches long? One 8 inches long?

3. What is the largest square you can draw on it?

When we wish to represent long lines, large squares, and rectangles, we often use a short line to stand for an inch or foot or yard.



A 2-inch square A 3-inch square A 4-inch square

Here are three drawings each 1 inch long, but they stand for squares of different sizes.

A stands for a square 2 inches long, but an inch in the side of the square is only a *half-inch* in the drawing, and so we say it is drawn on a "scale of $\frac{1}{2}$" or "a half-scale."

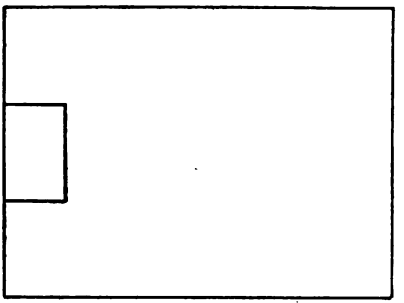
B is a picture of a 3-inch square, but an inch in the picture is only *one third* of an inch in the real square. The drawing is on a "$\frac{1}{3}$ scale."

C shows a 4-inch square where a line 4 inches long measures only 1 inch in the picture. One inch is $\frac{1}{4}$ of 4 inches, and so we say the drawing is on "a scale of $\frac{1}{4}$."

4. Draw an 8-inch square on a scale of $\frac{1}{4}$. What is $\frac{1}{4}$ of 8? How long will your picture be?

5. Draw an oblong 4 inches long and 2 inches wide on a scale of $\frac{1}{4}$.

6. Here is a drawing of the floor of a schoolroom. An inch in the drawing shows 20 feet in the room. How long and wide is the room?



7. On a map, two cities are 4 inches apart. If the map is drawn "200 miles to the inch," how far is one city from the other?

8. Draw a rectangle whose length is 12 inches and whose width is 8 inches, on a scale of $\frac{1}{4}$.

9. Make a drawing like the one in Ex. 6 in which 1 inch will represent 40 feet.

10. A table top is 2 feet square. Let 1 foot be represented by 1 inch in a "$\frac{1}{2}$ scale" drawing.

11. Draw the same table top to a "$\frac{1}{4}$ scale."

12. Draw a pattern for an iron holder 6 inches by 12 inches on a "$\frac{1}{2}$ scale."

13. Draw the same pattern on a "$\frac{1}{3}$ scale."

14. Make a drawing of your desk top on any scale you choose.

1. Draw a line 1 foot long on the blackboard. Draw one on your tablet 1 inch long. If we let the line on the tablet represent the one on the blackboard, 1 *inch represents* 1 *foot*. How long a line on your tablet will represent 1 yard on the blackboard?

2. If you let 1 inch represent 1 yard, what will represent 3 yards?

3. If you let $\frac{1}{2}$ inch represent 1 foot, what will represent 2 feet? What will represent 3 feet? 4 feet?

4. If you let 1 inch represent 1 yard, how many inches will represent the length of your schoolroom? What will represent the width of your schoolroom?

5. Draw a pattern for a box 3 feet long, 2 feet wide, and 1 foot deep, representing 1 foot by 1 inch.

6. Make a drawing to represent the floor of your schoolroom, representing 1 yard by 1 inch. (Do not count parts of a yard.)

7. Represent the blackboards of your schoolroom, using 1 inch for 1 yard.

8. A drawing is 3 inches long and 2 inches wide. If an inch represents 3 feet, how large is the rug that the drawing represents?

9. Helen makes a drawing of her flower bed, which is 12 feet long and 8 feet wide. What will be the size of her drawing if $\frac{1}{2}$ inch represents a foot?

1. The *square inch* on page 89 is a square 1 inch on a side. What is a *square foot*? What is a *square yard*?

A square 1 *inch on a side is a* **square inch.**
A square 1 *foot on a side is a* **square foot.**
A square 1 *yard on a side is a* **square yard.**

2. Draw a square foot on the blackboard. Draw a square yard.

3. Represent a square yard on your tablet. Let 1 inch represent 1 foot. Make points on the sides to represent 1 foot.

4. Draw lines in the picture you have made that will divide the square yard into square feet. How large is the square that represents a square foot?

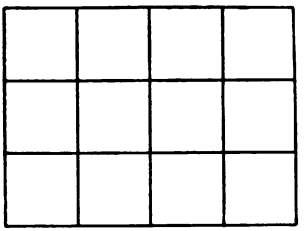
5. How many square feet in a square yard?

9 square feet make 1 square yard
9 sq. ft. = 1 sq. yd.

6. How many square feet in 2 square yards? How many in 3 square yards? In 4 square yards? In 5 square yards?

7. How many square yards in 18 square feet? How many in 27 square feet?

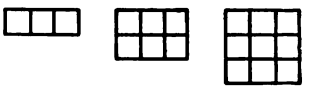
1. On squared paper work out a rectangle like the one here shown. Let each division represent 1 inch. How long is the rectangle? How wide is it? How many square inches does it represent?



2. Draw a square 4 inches by 4 inches. How many square inches does it contain?

3. Draw a rectangle 4 inches by 5 inches. How many square inches does it contain?

4. On squared paper work out rectangles that show the table of 3's in multiplication as shown in the margin.



5. As in Exercise 4, show by a rectangle the tables of 4's and 5's.

6. Make a rectangle containing 8 square inches. Show from the rectangle that $\frac{1}{2}$ of 8 is 4.

7. As in Exercise 6, show that

$\frac{1}{2}$ of 12 is 6.	$\frac{1}{2}$ of 18 is 9.
$\frac{1}{2}$ of 14 is 7.	$\frac{1}{2}$ of 20 is 10.
$\frac{1}{2}$ of 16 is 8.	$\frac{1}{2}$ of 10 is 5.

8. Draw rectangles to show $\frac{1}{3}$ of the following:

9 12 15 18 21 24 27 30

9. Draw a rectangle to show that $\frac{1}{4}$ of 12 is 3.

Use any one of the following numbers until all are used to fill the first blank in Ex. 1, *and then solve the problem:*

3, 7, 5, 8, 9, 6, 4, 2, 5, 10.

1. When 1 quart of milk costs 5 cents, —— quarts will cost —— times 5 cents, or —— cents.

2. How much will 4 oranges cost at 3¢ each?

3. At 5¢ a pound, how much will 9 pounds of rice cost?

4. How much will 9 yards of lace cost at 4¢ a yard?

5. At $2 a bushel, how much will 7 bushels of beans cost?

Use one of these numbers to fill the first blank in Ex. 6:

16, 12, 20, 8, 24, 36, 40, 28, 32.

6. When 4 pounds of sugar cost —— cents, 1 pound will cost $\frac{1}{4}$ of —— cents, or —— cents.

7. 4 quarts of oil cost 28¢. How much will 1 quart cost?

8. How much will 1 quart of milk cost when 5 quarts cost 50¢?

9. 6 yards of silk cost $18. How much will 1 yard cost?

Use one of these numbers to fill the first blank in Ex. 10:

10, 20, 15, 35, 40, 25, 30, 45, 50.

10. When 5 pints of oil cost —— cents, one pint will cost $\frac{1}{5}$ of —— cents, or —— cents; 3 pints will cost 3 × —— cents, or —— cents.

1. 2×3 feet = —— feet; $3 \times \$5 = \$$——.
2. 4×5 tens = —— tens; $4 \times 50 =$ ——.
3. 5×6 tens = 30 tens = ——; $5 \times 60 =$ ——.
4. 5×4 tens = —— tens = ——; $5 \times 40 =$ ——.
5. $3 \times 20 =$ ——; $3 \times 40 =$ ——; $6 \times 20 =$ ——.

Give the products:

1. 3 × 4	2. 30 × 4	3. 5 × 3	4. 50 × 3	5. 6 × 2	6. 60 × 2
7. 6 × 5	8. 60 × 5	9. 7 × 4	10. 70 × 4	11. 7 × 5	12. 70 × 5
13. 8 × 3	14. 80 × 3	15. 9 × 5	16. 90 × 5	17. 6 × 4	18. 60 × 4

19. Frank bought 3 dozen oranges at 30 cents a dozen. How much did they cost?

20. Emma's mother bought 4 dozen eggs at 20 cents a dozen. How much did they cost?

21. At 20 cents a dozen, how many oranges can you buy for 10 cents? How many for 40 cents?

Give the products:

22.	23.	24.
$2 \times 9 =$ ——.	$5 \times 6 =$ ——.	$4 \times 9 =$ ——.
$2 \times 90 =$ ——.	$5 \times 60 =$ ——.	$4 \times 90 =$ ——.
25.	**26.**	**27.**
$4 \times 3 =$ ——.	$3 \times 7 =$ ——.	$3 \times 9 =$ ——.
$4 \times 30 =$ ——.	$3 \times 70 =$ ——.	$3 \times 90 =$ ——.

NOTE. — The introduction of simple exercises in "written multiplication" will keep up interest while drill in the tables is still necessary. Let the first example be solved at the board by the teacher and questions asked that will bring out the following explanation. There is no "carrying" yet.

1. 2×5 ones = ——— ones. 2×6 tens = ——— tens.

2. Find the product of 2×32.

WORK	EXPLANATION. — $32 = 3$ *tens* $+ 2$ *ones*.
32	2×2 *ones* $= 4$ *ones*, and the 4 is written in *ones'* column.
2	2×3 *tens* $= 6$ *tens*, and the 6 is written in *tens'* column. The product is 64.
64	

In this way find the products of:

3.	4.	5.	6.	7.	8.	9.	10.
42	63	84	71	11	12	13	54
2	2	2	2	2	2	2	2

11.	12.	13.	14.	15.	16.	17.	18.
83	74	64	31	33	44	83	52
2	2	2	2	2	2	2	2

19.	20.	21.	22.	23.	24.
23	42	62	71	83	90
×3	×3	×3	×3	×3	×3

25.	26.	27.	28.	29.	30.
124	243	344	321	432	541
×2	×2	×2	×2	×2	×2

31.	32.	33.	34.	35.	36.
621	702	311	512	402	712
×4	×4	×4	×4	×4	×4

1. Using splints in bunches of tens and ones, show what each figure of 32 means.

2. 5 times the 2 ones of 32 are how many ones?

3. 5 times the 3 tens of 32 are how many tens?

4. 4×2 tens = —— tens. 3×3 tens = —— tens.

5.

20	30	20	40	30	30	40	60	70	80
4	2	3	2	3	5	3	2	5	4

6. Find 5×32.

WORK	
32	EXPLANATION. — 5×2 ones are 10 ones; 5×3 tens $= 15$ tens, that is, $5 \times 30 = 150$. Adding 10 and 150 we get 160.
5	
10	
150	
160	

7. *Find the products of:*

23	26	38	28	34	42	47	56	85	96
4	3	4	2	5	6	2	3	3	2

8. Ralph's father bought two ponies for him at $86 each. What did the two cost?

9. A yard is 36 inches. How many inches in 4 yards?

NOTE. — Let the first work in multiplication be the complete form as in Example 6. This gives a better understanding of the work. The pupil can easily discover the shorter forms.

1. Find 5 times 48.

WORK

$$\begin{array}{r} 48 \\ \times\ 5 \\ \hline 40 \\ 200 \\ \hline 240 \end{array}$$

EXPLANATION. — 48 = —— tens and —— ones. 5×8 ones = ——. 5×4 tens = —— tens. 20 tens and 4 tens = ——.

By holding the 4 tens in mind until we know how many more tens we have we can add them before writing. This will make less writing. We could then have written it as at the right.

WORK

$$\begin{array}{r} 48 \\ \times\ 5 \\ \hline 240 \end{array}$$

2. Find 4 times 36.

WORK

$$\begin{array}{r} 36 \\ \times\ 4 \\ \hline 144 \end{array}$$

EXPLANATION. — What did we do first?
How many tens did we have to keep in mind?
How many more did we have to put with the 2 tens?

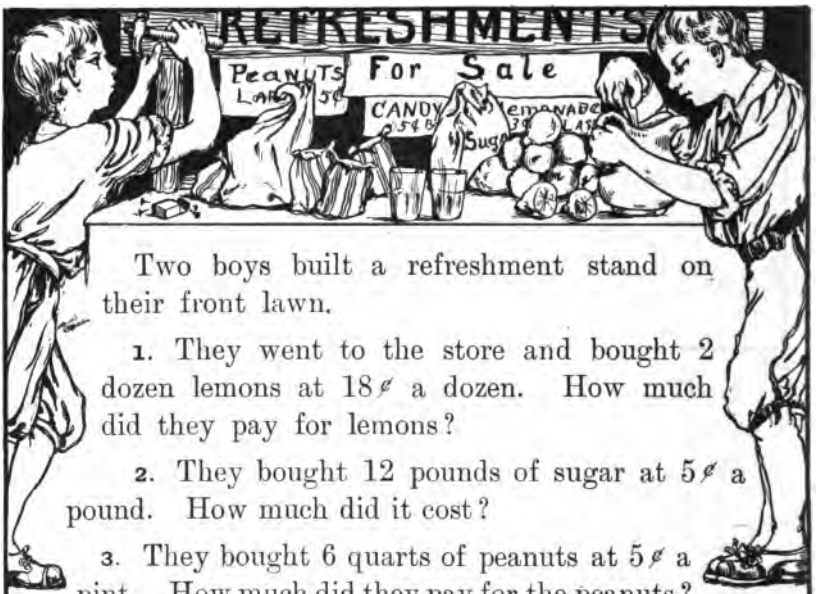
Find the products in the short way:

3. $\begin{array}{r} 27 \\ \times\ 3 \\ \hline \end{array}$	4. $\begin{array}{r} 18 \\ \times\ 3 \\ \hline \end{array}$	5. $\begin{array}{r} 37 \\ \times\ 2 \\ \hline \end{array}$	6. $\begin{array}{r} 49 \\ \times\ 2 \\ \hline \end{array}$	7. $\begin{array}{r} 78 \\ \times\ 2 \\ \hline \end{array}$	8. $\begin{array}{r} 96 \\ \times\ 2 \\ \hline \end{array}$
9. $\begin{array}{r} 84 \\ \times\ 4 \\ \hline \end{array}$	10. $\begin{array}{r} 96 \\ \times\ 4 \\ \hline \end{array}$	11. $\begin{array}{r} 84 \\ \times\ 5 \\ \hline \end{array}$	12. $\begin{array}{r} 73 \\ \times\ 4 \\ \hline \end{array}$	13. $\begin{array}{r} 84 \\ \times\ 3 \\ \hline \end{array}$	14. $\begin{array}{r} 79 \\ \times\ 4 \\ \hline \end{array}$

15. 3×56	18. 5×23	21. 4×34	24. 4×42
16. 4×78	19. 3×98	22. 5×27	25. 3×53
17. 5×27	20. 5×72	23. 5×32	26. 4×43

27. What will 5 stoves cost at $85 each?

28. What can a man earn in 4 months at $75 a month?



Two boys built a refreshment stand on their front lawn.

1. They went to the store and bought 2 dozen lemons at 18¢ a dozen. How much did they pay for lemons?

2. They bought 12 pounds of sugar at 5¢ a pound. How much did it cost?

3. They bought 6 quarts of peanuts at 5¢ a pint. How much did they pay for the peanuts?

4. How much did the lemons, sugar, and peanuts all cost?

5. In paying for this they gave the clerk a $2 bill. How many cents was that? How much change did the clerk give them?

6. They used part of the sugar for candy and part for lemonade. They sold 15 bags of candy at 5¢ a bag. How much did they get for candy?

7. Their mother made them some pop-corn balls. They sold 16 of them for 5¢ each. How much did they get for them?

1. 12 feet ÷ 5; $\frac{1}{6}$ of 18 miles; 7)21 cents

2. 5)25 tens 6)24 tens 5)250 6)240

Give quotients quickly:

3. 3)60 4)80 3)90 4)120 6)120 4)160

4. 5)150 3)150 7)210 8)240 6)360 7)420

Give the quotients and remainders:

5. 3)7 2)5 3)10 2)9 4)9 4)11

6. 4)17 5)12 6)14 7)9 6)19 7)22

Written Work

7. Divide 86 by 2.

WORK	EXPLANATION. — $\frac{1}{2}$ of 8 *tens* = 4 *tens*; $\frac{1}{2}$ of 6 *ones* = 3 *ones*. So 86 ÷ 2, or $\frac{1}{2}$ of 86 = 4 *tens* and 3 *ones*, or 43.
2)86	
43	

Find the quotients:

8. 96 ÷ 3 12. 693 ÷ 3 16. 4550 ÷ 5

9. 155 ÷ 5 13. 1863 ÷ 3 17. 3284 ÷ 4

10. 162 ÷ 2 14. 1284 ÷ 4 18. 505 ÷ 5

11. 108 ÷ 2 15. 2488 ÷ 4 19. 4884 ÷ 4

NOTE. — The exercises at the top of the page show a kind of drill work that must precede the written work. Let the first written work be the kind shown here in which there is no remainder left after each division. The more general kind is shown on the next page. Resort to splints if you feel that the process cannot be understood without them. We are seeking to image number represented by figures. Discard the splints or other devices as soon as possible.

Give quotients rapidly:

1. $4\overline{)40}$ $4\overline{)28}$ $5\overline{)35}$ $4\overline{)16}$ $5\overline{)20}$ $4\overline{)24}$ $3\overline{)18}$

2. $4\overline{)32}$ $4\overline{)36}$ $5\overline{)45}$ $5\overline{)50}$ $3\overline{)21}$ $3\overline{)9}$ $3\overline{)12}$

Give quotients and remainders:

3. $4\overline{)19}$ $5\overline{)23}$ $4\overline{)23}$ $3\overline{)17}$ $4\overline{)25}$ $5\overline{)27}$ $5\overline{)34}$

4. $3\overline{)20}$ $5\overline{)31}$ $4\overline{)33}$ $3\overline{)29}$ $3\overline{)32}$ $5\overline{)32}$ $5\overline{)47}$

5. *Give* $\frac{1}{2}$ *of:* 10, 12, 14, 18, 20, 8, 16, 6.

6. *Give* $\frac{1}{3}$ *of:* 9, 12, 21, 18, 15, 24, 30, 27.

7. *Give* $\frac{1}{4}$ *of:* 32, 16, 20, 12, 24, 8, 28, 36, 40.

8. *Give* $\frac{1}{5}$ *of:* 30, 20, 40, 15, 25, 45, 35, 10, 50.

How shall we find $\frac{1}{3}$ of 78?

WORK

$3\overline{)78}$
26

EXPLANATION. — 78 = 7 *tens* + 8 *ones*, or 6 *tens* + 18 *ones*. $\frac{1}{3}$ of 6 *tens* = 2 *tens*; $\frac{1}{3}$ of 18 *ones* = 6 *ones*. So $\frac{1}{3}$ of 78 = 2 *tens* + 6 *ones*, or 26.

In dividing we say 3 in 7, 2 times, and 1 remaining; 3 in 18, 6 times. Quotient 26.

9. $\frac{1}{2}$ of 32

10. $\frac{1}{3}$ of 45

11. $\frac{1}{4}$ of 56

12. $\frac{1}{5}$ of 65

13. 4 in 64

14. 5 in 75

15. 72 ÷ 4

16. 95 ÷ 5

17. $2\overline{)116}$

18. $3\overline{)138}$

19. $4\overline{)252}$

20. $4\overline{)348}$

NOTE. — The teacher should do the work of the illustrative example and by questions lead to the explanation.

Find the quotients:

1. $134 \div 2$	6. $725 \div 5$	11. $1348 \div 4$
2. $625 \div 5$	7. $984 \div 4$	12. $2345 \div 5$
3. $476 \div 4$	8. $376 \div 4$	13. $6795 \div 3$
4. $378 \div 3$	9. $831 \div 3$	14. $4716 \div 3$
5. $648 \div 4$	10. $698 \div 2$	15. $8735 \div 5$

Oral Problems

16. How much will 1 orange cost when 5 cost 50 cents?

17. I paid 18 cents for 3 pencils. How much was that for each?

18. When milk sells for 5 cents a quart, how much can be bought for 40 cents?

19. If you are in school 5 hours each day, how many hours are you in school in 5 days?

20. A dealer paid \$3 a dozen for caps. How many dozen could he buy for \$21?

21. When I pay \$5 for a dozen hens, how many dozen will \$35 buy?

22. If a boy lives 5 blocks from school, how many blocks must he walk in going to school twice a day and returning?

23. At 4 cents a pint, how much are 9 pints of chestnuts worth?

24. At 5 cents a quart, what must your mother pay for 9 quarts of milk?

1. *Add:*

6	7	8	9
6	7	8	9
6	7	8	9
6	7	8	9
6	7	8	9
6	7	8	9

2. $6 \times 6 = ?$ $6 \times 7 = ?$ $7 \times 6 = ?$ $6 \times 8 = ?$ $8 \times 6 = ?$ $6 \times 9 = ?$ $9 \times 6 = ?$

3. $6)\underline{36}$ $6)\underline{42}$ $6)\underline{48}$ $9)\underline{54}$ $7)\underline{42}$ $8)\underline{48}$ $5)\underline{54}$

4. You have studied 6 times every number from 6×2 to 6×5. You now have above —— new products with 6. Give them quickly.

5. Give all the products from 6×1 to 6×9.

6. Count by sixes from 6 to 54. Say 6, 12, 18, and so on to 54. Count back by sixes from 54 to 6.

7. *Give the products quickly:*

6	3	6	5	6	6	9
6	6	7	6	8	4	6

Table of 6's

$6 \times 1 = 6$	$6 \times 6 = 36$	$6 \div 6 = 1$	$36 \div 6 = 6$
$6 \times 2 = 12$	$6 \times 7 = 42$	$12 \div 6 = 2$	$42 \div 6 = 7$
$6 \times 3 = 18$	$6 \times 8 = 48$	$18 \div 6 = 3$	$48 \div 6 = 8$
$6 \times 4 = 24$	$6 \times 9 = 54$	$24 \div 6 = 4$	$54 \div 6 = 9$
$6 \times 5 = 30$	$6 \times 10 = 60$	$30 \div 6 = 5$	$60 \div 6 = 10$

1. 23	2. 42	3. 54	4. 34	5. 72
×6	×6	×6	×6	×6
6. 21	7. 12	8. 39	9. 45	10. 87
×6	×6	×6	×6	×6

11. How much does a boy earn in 2 weeks of 6 work days each if he earns 65 cents in one day?

12. A boy delivers 34 papers on each of five days and 48 on Saturday. How many does he deliver in all?

13. What does he earn a day if he gets 1 cent for delivering two papers? What does he earn in a week?

14. A boy has 4 recitations a day. How many recitations does he have in 6 weeks of 5 school days each?

15. What will 16 gallons of milk cost me at 6 cents a quart?

16. There are 31 days in July. What will my milk bill be for the month if I pay 6 cents a quart and get 1 quart a day?

17. Charles caught 27 perch, and James and Henry together caught 6 times as many. How many did all three catch?

18. A boy sells 23 copies of the *Evening News* and 19 copies of the *Journal* every day. How many papers does he sell in a week, not counting Sunday?

19. A boy worked 6 days at 40 cents a day. How much did he earn?

1. A farmer had a 6-acre field of potatoes. How many bushels in his whole crop if he got 236 bushels per acre?

2. If a boy earns 65 cents a day for 5 days, what does he earn in all?

3. How many quarts in 264 gallons?

4. 173 gallons of syrup will fill how many quart bottles?

5. A boy delivers 72 papers a day. How many does he deliver in 6 days?

Find the products:

6.	7.	8.	9.	10.
268	793	865	931	827
6	5	6	4	5

11. 4×368.
12. 6×928.
13. 5×793.
14. 6×841.
15. 5×167.
16. 4×268.
17. 5×899.
18. 6×798.
19. 4×643.

Find the quotients:

20.	21.	22.	23.	24.
$4\overline{)168}$	$5\overline{)155}$	$6\overline{)186}$	$3\overline{)969}$	$4\overline{)208}$

25. $189 \div 3$.
26. $355 \div 5$.
27. $366 \div 6$.
28. $246 \div 6$.
29. $248 \div 4$.
30. $324 \div 4$.
31. $405 \div 5$.
32. $450 \div 5$.
33. $426 \div 6$.
34. 4×236.
35. 5×240.
36. 6×150.
37. $726 \div 3$.
38. $840 \div 4$.
39. $792 \div 6$.
40. 5×783.
41. 6×829.
42. 4×967.

1. $2 \times 7 = 7 \times 2$, $3 \times 7 = 7 \times 3$, and so on. You know the table of 7's to 7×6. Write it.

2. Show by drawing a rectangle and dividing into square inches that

$7 \times 7 = 49$ $7 \times 8 = 56$ $7 \times 9 = 63$ $7 \times 10 = 70$

3. *Give quickly:*

$7)\underline{49}$ $7)\underline{63}$ $7)\underline{56}$ $7)\underline{70}$

Find the products:

4.	5.	6.	7.	8.	9.
345 × 7	246 × 7	841 × 7	923 × 7	726 × 7	847 × 7

10.	11.	12.	13.	14.	15.
936 × 7	819 × 7	738 × 7	645 × 7	836 × 7	748 × 7

Find the quotients:

16.	17.	18.	19.	20.	21.
$7)\underline{168}$	$7)\underline{294}$	$7)\underline{364}$	$7)\underline{245}$	$7)\underline{581}$	$7)\underline{644}$

Table of 7's

$7 \times 1 = 7$	$7 \times 6 = 42$	$7 \div 7 = 1$	$42 \div 7 = 6$
$7 \times 2 = 14$	$7 \times 7 = 49$	$14 \div 7 = 2$	$49 \div 7 = 7$
$7 \times 3 = 21$	$7 \times 8 = 56$	$21 \div 7 = 3$	$56 \div 7 = 8$
$7 \times 4 = 28$	$7 \times 9 = 63$	$28 \div 7 = 4$	$63 \div 7 = 9$
$7 \times 5 = 35$	$7 \times 10 = 70$	$35 \div 7 = 5$	$70 \div 7 = 10$

DECEMBER, 1910						
Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

1. Name the days in a week. How many days in 4 weeks?

2. The month of December has how many days more than 4 weeks?

3. February is the shortest month of the year. It has just 4 weeks. How many days in February?

4. June has 30 days, or —— days more than 4 weeks.

5. There are 52 weeks and 1 day more in a year. How many days in a year?

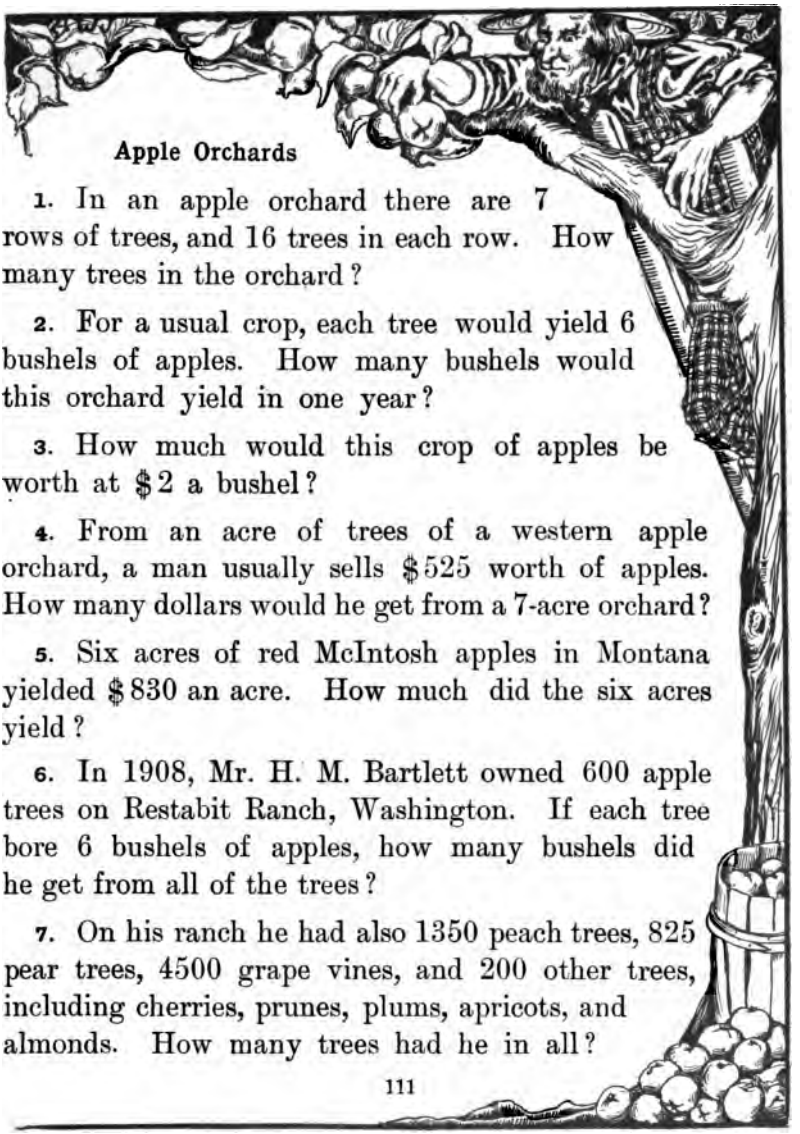
7 days make 1 week
52 weeks make nearly 1 year

6. How many weeks in 35 days? In 42 days? In 56 days? In 49 days?

7. It is 8 weeks till Christmas; how many days is this?

8. How much more than 4 weeks in each month?

January, 31 days	July, 31 days
February, 28 days	August, 31 days
March, 31 days	September, 30 days
April, 30 days	October, 31 days
May, 31 days	November, 30 days
June, 30 days	December, 31 days



Apple Orchards

1. In an apple orchard there are 7 rows of trees, and 16 trees in each row. How many trees in the orchard?

2. For a usual crop, each tree would yield 6 bushels of apples. How many bushels would this orchard yield in one year?

3. How much would this crop of apples be worth at $2 a bushel?

4. From an acre of trees of a western apple orchard, a man usually sells $525 worth of apples. How many dollars would he get from a 7-acre orchard?

5. Six acres of red McIntosh apples in Montana yielded $830 an acre. How much did the six acres yield?

6. In 1908, Mr. H. M. Bartlett owned 600 apple trees on Restabit Ranch, Washington. If each tree bore 6 bushels of apples, how many bushels did he get from all of the trees?

7. On his ranch he had also 1350 peach trees, 825 pear trees, 4500 grape vines, and 200 other trees, including cherries, prunes, plums, apricots, and almonds. How many trees had he in all?

1. You should now know all the tables except *five new facts*. You know the 8's to 8×7. Give them.

2. You know the 9's to 9×8. Give them.

3. The new facts are:

$8 \times 8 = 64$ $8 \times 9 = 72$ $8 \times 10 = 80$ $9 \times 9 = 81$ $9 \times 10 = 90$

4. $\frac{1}{5}$ of $40 =$ ——. $\frac{1}{6}$ of $48 =$ ——. $\frac{1}{8}$ of $48 =$ ——.

5. $\frac{1}{7}$ of $56 =$ ——. $\frac{1}{8}$ of $56 =$ ——. $56 \div 8 =$ ——.

6. Eight rows of desks with 8 in a row are —— desks.

7. To get 64 I must add —— 8's. $8 \times 8 =$ ——.

8. $64 - 56 =$ ——. $56 +$ —— $= 64$. $7 \times 8 =$ ——.

9. $\frac{1}{8}$ of $56 =$ ——. $\frac{1}{8}$ of $64 =$ ——. $\frac{1}{8}$ of $48 =$ ——.

10. $9 \times 8 =$ ——. $\frac{1}{8}$ of $72 =$ ——. $\frac{1}{9}$ of $72 =$ ——.

Table of 8's and 9's

$8 \times 1 = 8$ $8 \div 8 = 1$	$9 \times 1 = 9$ $9 \div 9 = 1$
$8 \times 2 = 16$ $16 \div 8 = 2$	$9 \times 2 = 18$ $18 \div 9 = 2$
$8 \times 3 = 24$ $24 \div 8 = 3$	$9 \times 3 = 27$ $27 \div 9 = 3$
$8 \times 4 = 32$ $32 \div 8 = 4$	$9 \times 4 = 36$ $36 \div 9 = 4$
$8 \times 5 = 40$ $40 \div 8 = 5$	$9 \times 5 = 45$ $45 \div 9 = 5$
$8 \times 6 = 48$ $48 \div 8 = 6$	$9 \times 6 = 54$ $54 \div 9 = 6$
$8 \times 7 = 56$ $56 \div 8 = 7$	$9 \times 7 = 63$ $63 \div 9 = 7$
$8 \times 8 = 64$ $64 \div 8 = 8$	$9 \times 8 = 72$ $72 \div 9 = 8$
$8 \times 9 = 72$ $72 \div 8 = 9$	$9 \times 9 = 81$ $81 \div 9 = 9$
$8 \times 10 = 80$ $80 \div 8 = 10$	$9 \times 10 = 90$ $90 \div 9 = 10$

NOTE. — Show the pupils that in the 9's the sum of the two digits of the product is 9, and that the tens' digit is one less than the number multiplied.

1. Multiply the following numbers first by 8 and then by 9. 2, 4, 6, 8, 3, 5, 7, 9.

2. Divide these numbers by 8: 16, 32, 48, 64, 40, 24, 56, 72.

3. Find $\frac{1}{9}$ of these numbers: 18, 36, 72, 27, 54, 81, 63, 45.

4. Take $\frac{1}{9}$ of 72 from $\frac{1}{8}$ of 72.

5. Which is larger, $\frac{1}{8}$ of 56 or $\frac{1}{9}$ of 63?

6. The boys of the Scammon School formed 6 baseball 9's. How many boys did it take?

7. If there are 81 boys in the third grade, how many baseball nines can they form?

8. Ann is 9 years old. Her mother is 4 times as old, and her father will be 5 times as old in 4 years. How old are Ann's parents?

9. In a classroom there are 8 seats in a row. There are 4 rows of girls and 3 rows of boys lacking 1 boy. How many pupils are there in the class?

10. In a checkerboard there are 8 rows of squares with 8 squares in each row. How many squares in all?

11. How many days in 9 weeks? In 7 weeks?

12. Tom Smart can jump 45 feet in 9 jumps. How many feet in each jump?

13. There are 72 trees in an orchard in 8 rows. How many trees in a row?

NOTE. — These tables and those that precede prepare for written work, and should be used repeatedly.

TABLE I

Divide the following numbers by 8, *giving quotients and remainders, first by columns and then by lines:*

	A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*
1.	8	40	56	32	72	16	48	64	80	24
2.	9	43	58	35	73	18	52	65	84	28
3.	12	41	61	37	77	21	49	69	87	29
4.	14	46	60	33	75	17	53	66	83	25
5.	10	42	59	38	79	22	50	70	86	30
6.	13	45	63	34	76	19	54	67	82	26
7.	11	47	62	39	74	23	51	71	85	31
8.	15	44	57	36	78	20	55	68	81	27

TABLE II

Divide these numbers by 9, *first by columns and then by lines, giving quotients and remainders:*

	A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*
1.	9	90	18	54	81	63	45	36	72	27
2.	10	95	22	58	82	68	46	37	77	36
3.	14	91	25	59	87	64	51	40	81	31
4.	11	96	19	55	83	69	47	44	76	35
5.	15	92	23	60	88	65	52	38	80	30
6.	12	97	26	63	84	70	48	41	75	34
7.	16	93	20	56	89	53	42	79	29	66
8.	13	98	24	61	85	71	49	39	74	33
9.	17	94	27	62	90	67	54	43	78	28
10.	18	99	21	57	86	50	45	73	32	72

1. Nellie gathered 125 daisies and Mary gathered 68. How many more did Nellie gather than Mary?

2. A man bought a carriage for $318 and sold it for $575. How much did he gain?

3. A woman went shopping with $115 and spent all but $68. How much did she spend?

4. If a boy earns $3 a week, how long will it take him to earn $240?

5. A man earned $820 and spent $165 of it. How much had he left?

6. After spending $45 I had $217 left. How much had I at first?

7. Mabel gathered 285 violets and gave $\frac{1}{3}$ of them to a sick girl. How many had she left?

8. Two children gathered 230 chestnuts. If one of them gathered 118 of them, how many did the other gather?

9. Ross had 167 marbles, William had 85, and Charles had 75. How many had they all?

10. Alice had 168 violets. She gave 45 to each of 2 girls. How many had she left?

11. A farmer sold his apples for $4 a barrel. He received $132 for them. How many barrels did he sell?

12. A boy sold 342 apples at the rate of 3 apples for 1 cent. How much did he receive for them?

13. A boy sold 608 papers in January and 473 in February. How many more did he sell in January than in February?

The coins commonly used in business are of the value of 1¢, 5¢, 10¢, 25¢, 50¢, and $1.

Besides coins, banknotes are also used; they are worth $1, $2, $5, $10, $20, and sometimes more.

1. John buys 17 cents' worth of paper, and gives the dealer a 25-cent piece. He will receive in change —— cents.

The dealer may count the change as he gives it to John. Beginning with the cost of the paper, he will say, — 17 and 3 are 20, and 5 are 25, or simply 17, 20, 25, — as he gives him 3 cents and a nickel.

2. Clara buys 38 cents' worth of thread and needles, and gives the clerk a half-dollar. She will receive —— cents in change.

The clerk says, — 38 and 2 are 40, and 10 are 50, or 38, 40, 50, — as he gives her 2 cents and a dime.

3. Make change out of a quarter for a 13-cent sale.

4. Count change out of a dollar for a 68-cent sale.

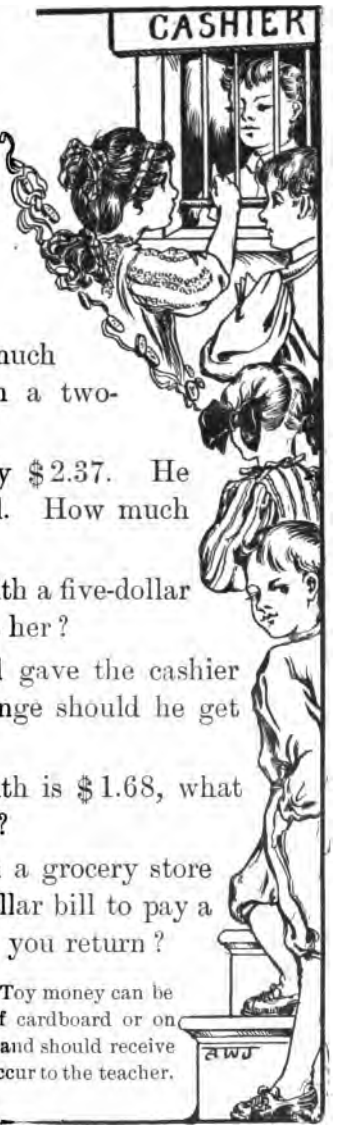
5. If you were a clerk, how would you count change for 51 cents if the buyer gave you $1?

6. Mr. Ward sells 7 qt. of milk at 8 cents and receives 3 silver quarters. Count the change for him.

Make change for:

7. $1.25 out of $5.
8. 73¢ out of $2.
9. 29¢ out of $\frac{1}{2}$.
10. $3 out of $10.
11. $1.56 out of $2.
12. 6 yd. at 11¢ out of $1.

"PLAYING CASHIER"



These children are playing cashier. The boy at the cashier's desk is playing that he is the cashier of a large gas company. The other children are playing that they are paying their monthly gas bills. They have toy money.

1. Martha owed the gas company a bill of $1.45. She handed the cashier a two-dollar bill. How much change should he give her?

2. Roger owed $1.13. How much change should he get back from a two-dollar bill?

3. Tom owed the gas company $2.37. He gave the cashier a five-dollar bill. How much change should he get back?

4. Lucy paid a bill of $3.16 with a five-dollar bill. How much change was due her?

5. If Samuel owed $2.89 and gave the cashier 2 two-dollar bills, how much change should he get back?

6. If your gas bill for the month is $1.68, what coins could you use in paying it?

7. Suppose you were cashier in a grocery store and a customer gave you a ten-dollar bill to pay a bill of $3.67. How much would you return?

NOTE. — Children like to play this game. Toy money can be made by writing the denominations on bits of cardboard or on paper. Making change is an important process and should receive much attention. Ways to vary the game will occur to the teacher.

1. Name the six coins in common use.

2. How much money would you have if you had one of each of these coins?

3. What is the entire value of the four silver coins?

4. Who makes the money we use? What is counterfeit money?

5. If you were asked to change a $20 bill, what seven smaller bills might you give instead?

6. If you were a clerk in a drug store, how would you count back the change from a two-dollar bill for a purchase of 42 cents?

7. Which are more convenient, silver dollars or dollar bills? Why? If 17 silver dollars weigh a pound, what will 5 pounds of silver dollars be worth?

8. If you carry to the bank 7 $5 bills, 1 $10 bill, and 10 half-dollars, what large bill could the cashier give you in exchange?

9. There are 30 dimes and 50 nickels in the contribution box. What is the value of the collection?

Count back the change from a five-dollar bill for these purchases:

10. $1.87	13. $3.37	16. $4.16
11. $2.52	14. $1.19	17. $1.48
12. $0.76	15. $2.64	18. $3.33

1. *Write in figures and add:*

three dollars and seventy-five cents,
four dollars and eighteen cents, and
two dollars and twelve cents.

2. *Subtract:*

six dollars and fourteen cents
from eight dollars and ninety-four cents.

Add the following:

3.	4.	5.	6.
$4.25	$2.96	$0.76	$16.25
3.74	4.13	4.90	8.32
2.18	2.50	3.17	0.64
6.41	3.25	2.75	0.05

Find the difference:

7.	8.	9.	10.
$8.73	$3.46	$16.89	$13.75
5.34	1.27	7.25	2.69

11. When one book costs $1.38, 7 books will cost $7 \times \$1.38$, or ——.

$1.38 = Multiplicand.
7 = Multiplier.
$9.66 = Product.

Remember that when there are cents in the multiplicand, the last two right-hand figures in the product will be cents, and must be separated from the dollars by a period.

Find the products:

12.	13.	14.	15.
$3.67	$8.39	$7.66	$8.25
4	6	7	8

16. When I divide $7.50 among 4 boys, each one will receive $\frac{1}{4}$ of $7.50, or ——.

Divisor = 4)$7.50 = Dividend.
$1.87 = Quotient.
$0.02 = Remainder.

Remember that the right-hand figures are cents when the dividend contains cents. Separate them from the dollars by a period.

Proof: $4 \times \$1.87 + \$0.02 = \$7.50$.

Find the quotients:

17. 8)$12.80 18. 6)$19.20 19. 7)$28.98 20. 5)$45.20

21. When Frank broke open his bank, he found that it contained 16 nickels, 12 dimes, 3 quarters, and 211 cents. How much could he pay towards a new suit?

22. Louise took her school stamp-book to the teacher and received money for these stamps:

16 one-cent stamps,
12 two-cent stamps,
14 five-cent stamps, and
6 ten-cent stamps.

How much money could she put into the savings bank?

23. Dorothy started for the store with $2.18 in her bag. She paid a nickel for her fare each way in the street car. She bought 2 yards of ribbon at 15 cents a yard, 3 papers of pins at 6 cents each, and a school umbrella for 75 cents. How much money did she spend? How much had she left?

1. A man paid $17.50 for a harness and 5 times as much for a carriage. How much did both cost?

2. A woman sold 8 dozen eggs for $1.84. How much was that a dozen? How much should she have received for 7 dozen?

3. I paid $18.60 each for 9 young calves and sold them all for $196. How much did I gain?

4. A dealer paid $65.50 for 8 rockers and retailed them at $9.75 each. What did he gain?

5. A boy earned $51.75 in 9 weeks. What was that per week? How much did he earn in 2 weeks? How much in 7 weeks?

6. I bought a watch for $42 and sold it so as to make $\frac{1}{6}$ of the cost. How much did I get for it?

7. When 9 sheep are worth $72, what are 18 worth? What are 45 worth? (Do not find the cost of one.)

8. How many quarts in 9 bushels?

9. How many bushels in 392 pecks?

10. How many gallons in 976 quarts?

11. How many pecks in 984 quarts?

12. When coal is $6 per ton, how much can I buy for $78?

13. If a barrel holds 3 bushels of apples, how many bushels will 40 barrels hold?

14. A merchant spent $336 for suits at $7 each. How many did he buy?

15. How many weeks in 245 days?

1. This is Christmas morning. Sydney and Lucile are playing with their toys. The doll cost $5.25. How much less than $10 is this?

2. Lucile got a little Morris-chair that cost $6.75. What did the doll and chair both cost?

3. Sydney got a "Humpty-dumpty" circus and menagerie. The 4 animals cost 75¢ each. What did the 4 cost?

4. The 4 actors and clowns each cost 85¢. What did the 4 cost?

5. The complete show cost $8.75. How much did all except the animals and people cost?

6. Sydney's toys in all were: the show, $8.75; a sled, $1.35; a pair of skates, $.85; a tool chest, $3.25. Find the cost of all.

7. Lucile's presents were as follows: a chair, $6.75; a doll, $5.25; "A Child's Garden of Verses," $1.75; "Poems of Childhood," $1.75. Find the cost of all.

8. Whose presents cost more, and how much?

1. I have my lawn cut 9 times during the summer. Each cutting costs 75 cents. How much in all?

2. My coal bin holds 6 tons. It was filled for $7.25 a ton, and housing cost 25 cents a ton more. What was the amount of my coal bill?

3. How much shall I pay for 8 pounds of butter at 38 cents, and 30 quarts of milk at 9 cents?

4. A crowded electric car contained 76 passengers. At 5 cents each, how much did the conductor collect?

5. Henry's bicycle cost $25. He sold it for $19.50. How much did he lose?

6. A balloon went up 1600 feet and then dropped 400 feet and then rose 200 feet. How high was it then?

7. In the morning there was $9.38 in my purse. At night I found that I had spent all but $2.65. How much had I spent?

8. A stone mason earns a cent a minute. How much is this for 1 hour? For 8 hours?

9. Each one of a flock of 64 hens lays 6 eggs a week. How many do all lay?

10. How much will 8 gallons of oil cost at 13 cents a gallon?

11. Add $\frac{1}{4}$ of 48, $\frac{1}{3}$ of 27, and $\frac{2}{3}$ of 12.

12. Emma helped her father count the collection taken in her Sunday school. There were 116 pennies, 24 nickels, 8 dimes, 3 quarters, a half dollar, and 2 dollar bills. How much was there in all?

1. How many inches in a foot? In $\frac{1}{2}$ a foot?

2. How many feet in a yard? In 4 yards?

3. 6 feet = —— yards.
   8 yards = —— feet.
   $\frac{1}{4}$ foot = —— inches.

4. 25 feet = —— yards —— foot.
   9 yards 2 feet = —— feet.
   $\frac{1}{3}$ foot = —— inches.

5. A rug is 36 inches long and 3 feet wide. What is its shape?

6. Edward lost $\frac{1}{2}$ of his kite string and had 100 feet left. How many feet did he have at first?

7. Two towns on a map are 3 inches apart. If every inch stands for 50 miles, how many miles apart are they?

8. Draw a rectangle 4 inches long and 3 inches wide. What is the distance around it? How many 1-inch squares will it contain?

9. How much will 8 yards cost at 5 cents a yard?

10. How many badges 4 inches long will a yard of ribbon make?

11. How many yards will be needed for 45 badges?

12. What would it cost to bind a square cushion 18 inches long with tape at $4\frac{1}{2}$ cents per yard?

13. A window 6 feet long requires a pair of curtains. How many yards of net will be required to allow a 3-inch hem at each end?

1. There are three schools in a town and each school has 268 pupils. Show two ways of finding how many pupils in all.

2. A man has 345 trees in each of 4 orchards. Use two ways of finding how many trees he has in all.

3. A party of 4 went nutting. On counting they found that they had 540 nuts each. How many in all? Find it in two ways.

4. A dealer sold 5 ponies at $135 each. How much did he get for all? Find it in two ways.

5. A man sold 4 building lots for $638 each. How much did he get for all?

6. A square lot is 342 feet long. How far around it?

7. If there are 386 apples in a barrel, how many apples in 5 barrels each containing as many?

8. A gardener raised 324 bushels of onions on one acre. At this rate, how many bushels could he have raised on 4 acres?

9. A gardener raised 6575 ears of corn on one acre. At this rate, how many ears could he have raised on 3 acres?

10. If a man's salary is $185 a month, how much will he receive for 5 months?

11. If a man pays $325 a year for house rent, how much will he pay in 4 years?

12. It is 283 miles from Detroit to Chicago. How many miles must one travel in going to Chicago from Detroit and returning?

1. A building lot cost $725 and a house 8 times as much. What did both cost?

2. Mary has 684 aster plants. If she puts an equal number in each of 6 rows, how many plants in each row?

3. A bushel of corn weighs 56 pounds. How many pounds in 4 bushels? In 6 bushels? In 7 bushels?

4. A man divides a farm of 524 acres into 4 equal fields. How many acres in each field?

5. A farmer got 224 bushels of grain from 9 acres. How many bushels did the field average per acre?

6. A man divides $875 among 7 children. How much does he give each?

7. If one small engine uses 326 pounds of coal in 1 day, how much will it use at this rate in 8 days?

8. A boy has 9 rows of potatoes. If each row yields 16 bushels, how many bushels will he have?

9. A gardener raised 328 bushels of onions and has sold $\frac{1}{4}$ of them. How many bushels remain?

10. A man bought 6 building lots at $324 each. How much did they all cost him?

11. There are 144 square inches in a square foot. How many square inches in 7 square feet? In 9 square feet?

12.	13.	14.	15.	16.
396 × 7	347 × 8	984 × 7	397 × 9	279 × 6

17.	18.	19.	20.	21.
7)378	6)144	8)256	9)342	7)392

PRIMARY ARITHMETIC

PART THREE: FOURTH YEAR

1. Tell what each figure represents in these numbers:
   246, 3465, 7340, 6304, 7035.

Write in figures:

2. One thousand, seven hundred, sixty-three.
3. Seven thousand, three hundred, seventy-nine.
4. Nine thousand, two hundred, seventy.
5. Eight thousand, sixty-eight.
6. Seven thousand, seventy.
7. Five thousand, five.

> *The fifth figure from the right, beginning with ones, represents* **ten-thousands.**
>
> *The sixth figure,* **hundred-thousands.**

8. 436,487 is read 436 *thousand,* 487.

Read the population of the following cities in 1910:

St. Louis, 687,029.	Boston, 670,585.
Cleveland, 560,663.	Detroit, 465,766.
Pittsburg, 533,905.	Buffalo, 423,715.

Reading numbers written in figures is **numeration.**

1. What *seven* letters are sometimes used to stand for numbers?

2. When do we use such a method of writing numbers?

3. *Give the value of each of the following:*

I V X L C D M

These letters are called the **Roman numerals.**

4. *Give the value of:*

I	VI (5 + 1)	XI (10 + 1)	LX (50 + 10)
II	VII	XX	LXX
III	VIII	XXX	LXXX
IV (5 − 1)	IX (10 − 1)	XL (50 − 10)	XC (100 − 10)
V	X	L	C

5. *Other numbers are written thus:*

20 + 3 = XX + III = XXIII = 23
40 + 5 = XL + V = XLV = 45
50 + 6 = L + VI = LVI = 56
60 + 7 = LX + VII = LXVII = 67
80 + 9 = LXXX + IX = LXXXIX = 89
100 + 6 = C + VI = CVI = 106

6. *Read the following numbers of chapters in a book:*

XIV	XXVII	XXXV	XLVIII	LXXXVI
XVI	XXIX	XXXVI	LXXI	XCVIII

7. *Learn the following:*

C = 100; CX = 110	D = 500; DXIV = 514
CC = 200; CCL = 250	DC = 600; DCLX = 660
CCC = 300; CCCV = 305	M = 1000; MM = 2000
CD = 400; CDXX = 420	MD = 1500; MCMV = 1905

1. Give rapidly the sums in the table on page 27.

2. Give rapidly the sums in the table on page 31.

3. Add 3 to each of the following:

17, 27, 37, 47, 67, 87, 97.

4. Add 4 to each of the numbers in exercise 3.

5. *Give the sum of each column:*

6397	5495	8264	3965	7149	2836
3487	3674	9832	4598	4376	8998
7767	4889	8976	4931	4897	7664
2459	8547	2364	5587	6938	6491
8975	4843	3623	7984	2654	3738

6. To each of the numbers below add 2; 3; 4; 5; 6; 7; 8; 9.

22	56	87	42	84	72	39	23	85	67	69	79	25
94	62	47	24	55	32	63	89	34	78	49	96	52

Copy and add:

7. 24, 28, 36, 25, 34, 27.

8. 22, 42, 57, 26, 31, 54.

9. 34, 44, 49, 34, 43, 46.

10. 37, 62, 97, 78, 58, 96.

NOTE. — In adding, say as few words as possible. In the first column of exercise 7, say 7, 11, 16, 22, 30, 34; or 4, 12, 18, 23, 27, 34, as you see the figures. Use time limits and work for accuracy and rapidity.

1. The number of passenger trains arriving at and departing from the six principal railway stations of Chicago each 24 hours on a certain date is given in the table below. Find the total number at the six stations.

Illinois Central	536
Chicago & Northwestern	409
Union	264
La Salle Street	230
Dearborn	113
Grand Central	42

2. The number of passengers in the five different coaches of a suburban train entering the city were 48, 53, 46, 39, and 57. How many passengers on the train?

3. A train load of children from the city left for different points in Indiana, where the children were given a two weeks outing in little towns and on farms. 14 got off at Cedar Lake, 19 at Rensselaer, 28 at Lafayette, 26 at Crawfordsville, 12 at Lodoga, 15 at Roachdale, and 18 at Greencastle. How many children were on the train?

4. At the La Salle Street station, the following numbers of tickets were sold in one day:

Chicago, Rock Island & Pacific	986
Chicago & Eastern Illinois	1247
Delaware, Lackawanna & Western	938
Lake Shore & Michigan Southern	1405
Nickel Plate	1179

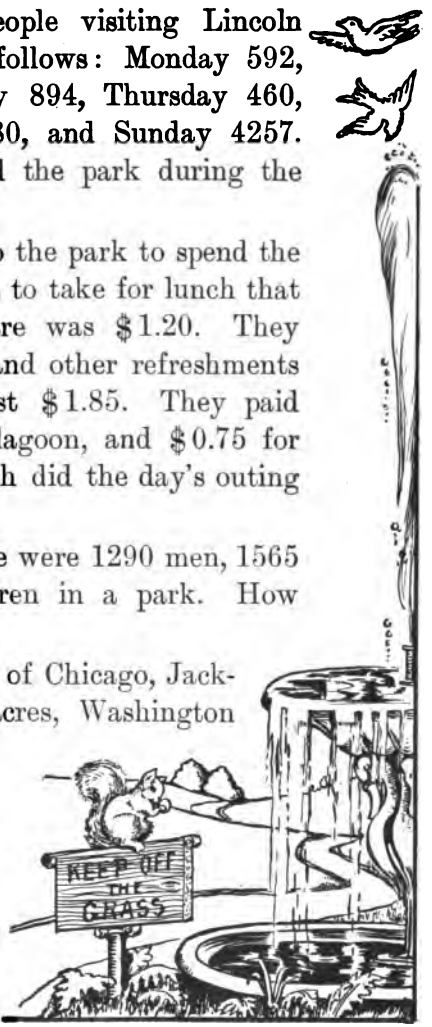
How many tickets were sold in all?

1. The number of people visiting Lincoln Park one week was as follows: Monday 592, Tuesday 608, Wednesday 894, Thursday 460, Friday 725, Saturday 680, and Sunday 4257. How many people visited the park during the week?

2. Some people went to the park to spend the day. They bought things to take for lunch that cost $2.65. Their carfare was $1.20. They bought ice cream cones and other refreshments during the day that cost $1.85. They paid $0.60 for boats on the lagoon, and $0.75 for riding ponies. How much did the day's outing cost them?

3. On one Sunday there were 1290 men, 1565 women, and 2190 children in a park. How many were there in all?

4. Of the larger parks of Chicago, Jackson Park contains 539 acres, Washington Park 371 acres, Marquette Park 323 acres, Grant Park 205 acres, Humboldt Park 206 acres, Garfield Park 188 acres, Douglas Park 182 acres, and Lincoln Park 317 acres. How many acres in all of these parks?



Below are a dealer's sales for a week. Find his sales for each day. Find the value of each kind of merchandise sold.

		1. Monday	2. Tuesday	3. Wednesday	4. Thursday	5. Friday	6. Saturday
7.	Coal,	$37.94	$246.93	$89.75	$841.96	$63.29	$63.92
8.	Wood,	39.75	81.92	91.32	372.94	87.58	74.85
9.	Cement,	24.62	101.75	3.75	86.91	14.62	59.81
10.	Lime,	19.83	93.65	69.48	18.42	93.87	6.43
11.	Hair,	17.69	29.32	27.85	9.75	49.24	2.84

12. My parlor is 18 ft. long and 14 ft. wide. My sitting room is 15 ft. long and $12\frac{1}{2}$ ft. wide. How much picture molding shall I need, allowing 4 ft. for waste?

13. Add all the numbers that end in 9 between 3748 and 3800.

14. James has $2.17, Edward has $1.25 more than James, and Charles has $2.74 more than Edward. How much money have the three boys?

15. What is the distance around a schoolroom 32 ft. long and 28 ft. wide?

16.	17.	18.	19.	20.
11398 +	13189 +	14298 +	12860 +	15967 +
3269	2383	3741	4164	1812
4058	5238	3195	2252	3316
6952	6338	8368	9147	7888
10942	4577	4613	3522	5283

Select from column A *the number opposite each letter in the words below and add the numbers thus taken.* Thus using the word *care,*

$c = 1052$
$a = 2432$
$r = 8673$
$e = 5432$
$17{,}589$

A	
a	2432
b	5243
c	1052
d	2345
e	5432
f	6533
g	2107
h	3756
i	2683
j	7546
k	8359
l	3625
m	4267
n	5426
o	9325
p	4763
q	9245
r	8673
s	2905
t	3876
u	8547
v	9458
w	6477
x	8532
y	4651
z	7896

1.	care	21.	wrong
2.	aunt	22.	brisk
3.	bond	23.	charm
4.	from	24.	drown
5.	inch	25.	empty
6.	milk	26.	friend
7.	plum	27.	gnash
8.	word	28.	handy
9.	buzz	29.	perch
10.	what	30.	whack
11.	drug	31.	absence
12.	join	32.	quietly
13.	lily	33.	zealous
14.	path	34.	trumpet
15.	skip	35.	wicked
16.	their	36.	smother
17.	foxes	37.	sweetly
18.	quick	38.	trusty
19.	eight	39.	careful
20.	dizzy	40.	extreme

41–80. *Use column* B *in the same way.*

B	
a	4934
b	5678
c	6789
d	5427
e	6958
f	3754
g	6849
h	3985
i	7667
j	8998
k	4935
l	6498
m	3776
n	5492
o	7896
p	3894
q	4977
r	6583
s	9878
t	4796
u	6948
v	3778
w	6945
x	3099
y	7856
z	6483

Subtract each of the following numbers from 100, *giving the remainders only:*

1. 11 88 44 74 52 70 36 13 60 75 37 48
2. 35 61 82 14 91 33 22 65 42 53 15 59
3. 83 30 23 57 89 43 95 29 90 32 84 26
4. 20 81 73 63 21 94 56 99 17 93 41 66
5. 36 19 62 45 96 18 50 46 76 40 71 62
6. Take 300 from 1000; 600 from 1100.
7. Take 250 from 500; from 750; from 1000.
8. *Give the differences as rapidly as possible at sight:*

67	59	75	86	94	47	85	53	78	59	135	265	31
30	40	60	50	71	32	53	23	36	48	80	95	7

9.

539	827	396	417	824	391	864	249	618	347
408	325	190	95	704	270	453	127	93	86

10.

1246	3721	4986	5478	3966	2791	4865	7983
300	600	880	5406	3900	2500	4105	6981

Find the difference between:

11. 1756 and 4553.
12. 16924 and 86693.
13. 2349 and 4682.
14. 2025 and 8141.
15. 15321 and 7659.
16. 8347 and 9238.
17. 6705 and 9477.
18. 6841 and 4038.
19. 7238 and 5467.
20. 3094 and 6243.

In subtraction, the number subtracted is called the **subtrahend.**

The number from which we subtract is called the **minuend.** The result is called the **difference** or **remainder.**

1. Find the difference between 4653 and 1796.

4653 Minuend
1796 Subtrahend
2857 Difference

2. Add 2857 and 1796.

3. Compare the result with the minuend.

4. In exercise 1 what is 1796 called? What is 2857 called?

To test or check subtraction we see whether the sum of the subtrahend and difference is equal to the minuend.

Find the difference and check:

5. Take 3486 from 9638.
6. Take 6964 from 8371.
7. Take 3739 from 6297.
8. Take 3269 from 5847.
9. Take 1763 from 9376.
10. Take 2365 from 8430.

11.	12.	13.	14.	15.
3465	4621	8463	8347	3468
1738	1705	1927	2961	1299

16. Take 3465 from 7182.
17. Take 1978 from 6347.
18. Take 2376 from 7849.
19. Take 4882 from 8641.
20. $4679 - 2834$.
21. $3294 - 789$.
22. $69 + 45 - 36$.
23. $1000 - 263 - 36$.

1. What is a bank? Have you seen people put money in a big bank or take money out?

2. Mr. Jones had $2715 in the bank, and drew out $947. How much did he have left in the bank?

3. Mr. Wallace was a grocer. He deposited in the bank every day all of the money that he took in at the store. During one week he put in the bank $165.45, $127.80, $216.50, $195.65, $284.37, and $340.50. How much did he put into the bank in the whole week?

4. At the end of the week Mr. Wallace paid his bills. These were $147.35, $63.85, $12.45, and $33.33. How much money did it take? To pay the bills he took money out of the bank. How much did he save that week?

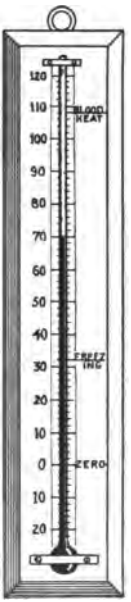
5. If your father had $960 in the bank, and drew out $175, how much would he have left in the bank?

6. If he drew out $286 more, how much would he then have left in the bank?

7. Charles put his earnings in a savings bank. One week he put in $1.65, the next $1.47, the next $2.18, and the next $1.95. How much did he then have in the bank?

8. Henry had $18.35 in the bank. When he started on his vacation, out of the city, he drew out $8.50. How much did he have left in the bank?

1. Can you tell the temperature of the air by looking at the thermometer?



2. Tell the temperature as shown on the thermometer in the picture.

3. Tell the temperature as shown by the thermometer in the schoolroom.

4. At what temperature does water freeze?

5. 32 degrees is written 32°. Subtract 32° from the temperature of the room and see how much above freezing it is.

6. The temperature of your body is about 98°. How much is that above freezing?

7. Water boils at 212°. How much is that above the temperature at which it freezes?

8. At 6 o'clock in the morning the thermometer stood at 63°. By 4 o'clock P.M. it had fallen to 47°. How many degrees did it fall?

9. When it is 68° in the room and 39° out of doors, how much colder is it out of doors?

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Highest . . .	86°	81°	79°	74°	84°	82°
Lowest . . .	78°	77°	68°	68°	69°	73°

10. Find the difference between the highest and lowest temperature for each day given in this table.

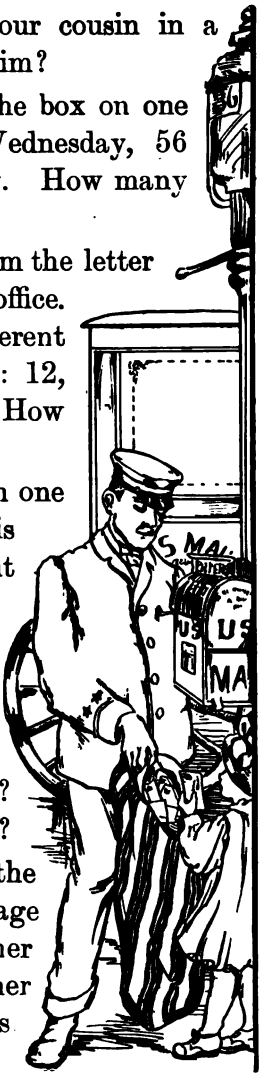
1. When you write a letter to your cousin in a distant city, how do you get it to him?

2. There were 36 letters put into the box on one corner Monday, 47 Tuesday, 39 Wednesday, 56 Thursday, 40 Friday, and 48 Saturday. How many in all six days?

3. A collector collects the letters from the letter boxes and delivers them at the post office. On one trip he gathered from the different boxes the following numbers of letters: 12, 48, 27, 19, 35, 51, 47, 38, 26, and 46. How many did he collect on the trip?

4. Mr. Smith is a business man. On one day he put into the mail box on his corner 168 one-cent letters, 184 two-cent letters, and 29 packages. How many pieces in all? What was the postage on all of the one-cent letters? On the two-cent letters? The postage on each package was 7 cents. What was the postage on all of the packages? How much did all the postage cost him?

5. Mary took Christmas gifts to the post-office and mailed them. The postage on one package was 28 cents, on another 35 cents, on another 19 cents, on another 47 cents, and on another 38 cents. How much was all of the postage?



1. One part of $3.94 is $1.51; find the other part.

2. Put together $1.59, $6.24, $8.37, and $5.62.

3. $369 + 542 + 387 + 921 - 849 =$ ——.

4. $4783 - 927 - 342 - 871 =$ ——.

5. Find the sum of $4.76, $2.57, and $1.75.

6. Edward received $8.32 at one time, and $1.65 at another. He paid out $4.19. What had he left?

7. A farmer has 38 acres of corn, 41 acres of wheat, and 19 acres of meadow. How many acres has he in all?

8. My pony cost $48, the harness $16, and the phaeton $65. What did all this cost me?

9. A farmer has 268 sheep and one half as many pigs. How many pigs has he? How many animals in all?

10. A postal clerk has 396 letters for Boston, 396 for New York, 1240 for Chicago, 209 for Washington, and 3627 for other places. How many letters has he in all?

11. James has $39.42; Henry has $14.36; Paul has as much as both James and Henry. How much money has Paul? How much have all three?

12. Take 368 from the sum of 246 and 397.

13.	14.	15.	16.	17.
915	283	374	263	876
347	527	639	647	849
738	982	874	672	764
728	129	937	804	374

1. A man paid $125 for a pony and $56 for a phaeton, and sold them both for $16 more than they cost him. What did he get for them?

2. In a small city are four ward schools. In one school are 417 pupils, in another 563, in another 398, and in the fourth 619. How many pupils are enrolled in the four schools?

3. A man paid $540 for a lot. He built a house on it costing $2340, a barn costing $982, spent in grading the lot $23, and paid $86 for walks. What was the total cost of the property?

4. A man bought a house for $3400. He paid $1375 at one time, $564 at another time, and $768 at another. How much does he still owe?

5. A trader paid $750 for three horses. He sold one for $328, another for $263, and the other for $378. What did he make on the three?

6. A merchant's sales for the week were as follows: Monday $368, Tuesday $419, Wednesday $396, Thursday $463, Friday $411, Saturday $763. What were the total sales for the week?

7. I bought three loads of coal containing the following number of pounds: 5268 pounds, 4973 pounds, 5098 pounds. How many pounds did I buy?

8. A man paid $756 for a building lot and paid out for lumber to build a house, $936, to the workmen $538, for other material $498. Find the total cost of the property.

1. This table gives the attendance of the four lower grades of a school for one week. Find the total attendance of all grades on each day, and the total attendance of each grade for the week.

Grade	Monday	Tuesday	Wednesday	Thursday	Friday
First	68	65	70	71	69
Second	63	64	68	59	66
Third	57	60	55	58	59
Fourth	52	54	55	51	57

2. Find the total area of the five Great Lakes:

Lake Michigan,	22,540 square miles
Lake Erie,	9,960 square miles
Lake Huron,	23,800 square miles
Lake Ontario,	7,240 square miles
Lake Superior,	31,200 square miles

3. The area of Illinois is 56,665 square miles. How much larger is Illinois than Lake Michigan?

4. Texas is the largest state, and contains 265,896 square miles. How much larger is Texas than all five of the Great Lakes together?

5. The length of Lake Michigan is 330 miles, of Lake Erie 270 miles, of Lake Huron 250 miles, of Lake Ontario 180 miles, and of Lake Superior 380 miles. Find their combined lengths.

1. By the Big Four Route, the number of miles from Chicago to Kankakee is 56, from Kankakee to Fowler 47, from Fowler to Lafayette 28, from Lafayette to Indianapolis 64, from Indianapolis to Cincinnati 111. How far is it from Chicago to Cincinnati?

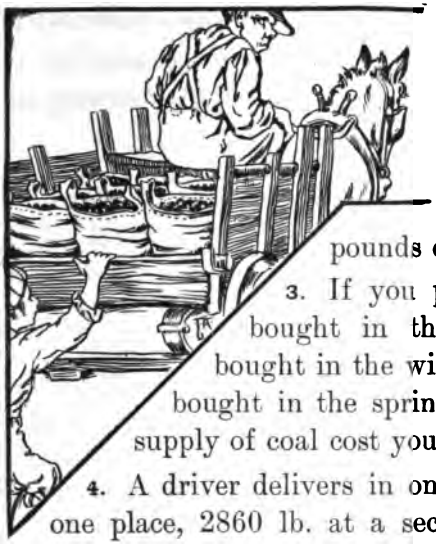
2. By the Northwestern Line, the number of miles from Chicago to Cedar Rapids is 219, from Cedar Rapids to Omaha 270, from Omaha to Cheyenne 517, from Cheyenne to Ogden 484, from Ogden to Sacramento 690, and from Sacramento to San Francisco 96. Find the distance from Chicago to San Francisco.

3. From Omaha to Lincoln is 58 miles, from Lincoln to Phillipsburg 186 miles, from Phillipsburg to Colby 103 miles, and from Colby to Denver 233 miles. How far is it from Omaha to Denver?

4. From Detroit to Buffalo is 251 miles, and from Detroit to New York City is 661 miles. How far is it from Buffalo to New York City?

5. The ship *Lusitania*, sailing from New York to Queenstown in 5 days, went 592 miles the first day, 578 miles the second, 580 miles the third, 565 miles the fourth, and 576 miles the fifth. How far is it from New York to Queenstown?

6. The highest mountain in the world is Mt. Everest, in Asia. Its height is 29,002 ft. The highest mountain in North America is Mt. McKinley. Its height is 20,300 ft. How much higher is Mt. Everest than Mt. McKinley?



1. Where does your coal come from?

2. If you buy 8500 lb. of coal in the fall, 7640 lb. in the winter, and 6680 lb. in the spring, how many pounds do you buy in a year?

3. If you pay $22.75 for the coal bought in the fall, $18.40 for that bought in the winter, and $16.25 for that bought in the spring, what does your year's supply of coal cost you?

4. A driver delivers in one day 3240 lb. of coal at one place, 2860 lb. at a second place, 3490 lb. at a third place, and 3720 lb. at a fourth place. How much does he deliver during the day?

5. A dealer sold 6000 lb. of coal to a customer. The driver delivered 1870 lb. the first load, and 2140 lb. the second load. How much must he put on the third load?

6. A driver weighed a load of coal in the wagon. The coal and wagon weighed 4864 lb. The wagon was known to weigh 1170 lb. How much coal was on the wagon?

7. A dealer bought four carloads of coal at the mine. The weights of the loads were: 54,640 lb., 48,835 lb., 42,790 lb., and 50,180 lb. How many pounds in all?

8. A coal dealer pays $4.65 a ton for coal and sells it at $6.25 a ton. How much does he make on a ton?

People from all parts of the world have come to live in the United States. The table gives the number of people coming in 1909, from the different countries of Europe, to live in the United States.

Country	Male	Female	Total
Austria	49,937	30,916	
Hungary	63,651	25,687	
Germany	14,948	10,592	
Greece	12,802	1,309	
Italy	147,583	35,635	
Norway	8,601	5,026	
Russia	77,997	42,463	
Sweden	8,967	5,507	
England	19,080	13,729	
Ireland	11,962	13,071	
Other countries	37,769	17,643	
Total			

1. Find the total number of people coming from each country.

2. Find the total number of males.

3. Find the total number of females.

4. Find the total number of people.

5. How many more males than females came from Austria? From Hungary? From Italy? From Russia?

6. From what one country did the most people come?

7. How many more people came from Italy than from Russia?

1. How many days in 52 weeks?

2. How many quart bottles can a dairyman fill from 96 gallons of milk?

3. If a man feeds his horse a peck of oats each day, how long will 84 bushels last?

4. If the entire length of the blackboards in your schoolroom is 46 feet and the width is 4 feet, how many square feet do they contain?

Multiply:

5.	6.	7.	8.	9.
3465	4973	5674	9376	4673
7	8	7	8	9

10.	11.	12.	13.	14.
2996	3762	4368	2467	5438
8	9	8	6	9

15. If a dealer sells 6 horses at $245 each, how much does he get for them?

16. A bushel of onions weighs 57 lb. Find the weight of 6 bu. Of 7 bu. Of 8 bu. Of 9 bu.

17. If an automobile goes 35 miles in an hour, how far will it go in 5 hours? In 7 hours? In 9 hours?

18. Find the cost of 7 sleds at $2.65 each.

19. Find the cost of 8 pairs of skates at $1.45 a pair.

1. If you buy 8 oranges of a fruit vender at 5¢ apiece, how much do they cost?

2. How much will a dozen peaches cost at 3 for 10¢?

3. What is the cost of 3 pineapples at 15¢ each?

4. How much will 3 bananas cost at 20¢ a dozen? How much will 9 cost?

5. James bought a half-dozen apples of a fruit vender at 2 for 5¢. How much did they cost?

6. If your mother buys 4 oranges when they are 45¢ a dozen, and 7 pineapples at 12¢ each, how much change should she receive from a dollar bill?

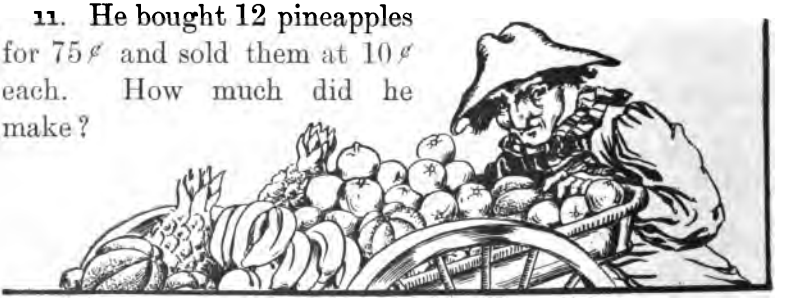
7. If a fruit vender buys four bunches of bananas at $1.35 a bunch, how much do they cost him?

8. If each bunch contains 9 dozen, how many dozen in the four bunches?

9. If he sells them at 20¢ a dozen, how much does he get for one bunch?

10. How much does he make on one bunch? How much on 4 bunches?

11. He bought 12 pineapples for 75¢ and sold them at 10¢ each. How much did he make?



A little girl had a doll house which her brother made for her. It had a living room, dining room, kitchen, and two bed rooms. Her father bought furnishings for it at a toy store.

1. He bought 4 rugs at 25¢ each and 6 pictures at 15¢ each. How much did all cost?

2. For the dining room he bought a table at 15¢, a set of dishes at 25¢, and 6 chairs at 10¢ each. How much did all cost?

3. For the living room he bought a couch at 25¢, a table at 25¢, a piano for 60¢, and 5 chairs at 10¢ each. How much did all cost?

4. For the bedrooms he bought 2 beds at 25¢ each, 2 mirrors at 10¢ each, 2 dressers at 15¢ each, and 4 chairs at 10¢ each. How much did all cost?

5. He also bought a kitchen cabinet for 25¢, a stove for 25¢, material for curtains for 20¢, a doll buggy for 85¢, and 6 little dolls at 15¢ each. How much did all these cost?

6. How much did all of the furnishings for the house cost? If the man who bought them handed the clerk a $10 bill, how much change should he receive?

7. If the toy dealer bought his 10¢ toys for 7¢ each, how much did he make on a dozen? On 3 dozen? On 5 dozen?

8. If he paid 9¢ each for the 15¢ toys, how much did he make on a dozen? On 5 dozen? On 6 dozen?

1. *Multiply:*

11	11	11	11	11	11	11	11	11
2	3	4	5	6	7	8	9	10

2. Since $2 \times 11 = 22$, $11 \times 2 =$ what?

3. Write out and memorize the table of 11's.

4. Multiply 345 by 11.

345 Multiply as with a number of one figure.
11 $11 \times 5 = 55$. Write 5 and add 5 to 11×4.
3795 $11 \times 4 + 5 = 49$. Write 9 and add 4 to 11×3.

Multiply:

5.	6.	7.	8.	9.	10.	11.
356	368	426	483	376	934	826
11	11	11	11	11	11	11

12. *Divide:*

11)22	11)44	11)66	11)55	11)77	11)88	11)99

13. Write out and learn the division table of 11's.

Table of 11's

$11 \times 1 = 11$	$11 \times 6 = 66$	$11 \div 11 = 1$	$66 \div 11 = 6$
$11 \times 2 = 22$	$11 \times 7 = 77$	$22 \div 11 = 2$	$77 \div 11 = 7$
$11 \times 3 = 33$	$11 \times 8 = 88$	$33 \div 11 = 3$	$88 \div 11 = 8$
$11 \times 4 = 44$	$11 \times 9 = 99$	$44 \div 11 = 4$	$99 \div 11 = 9$
$11 \times 5 = 55$	$11 \times 10 = 110$	$55 \div 11 = 5$	$110 \div 11 = 10$

14. Remember these: $11 \times 11 = 121$ $121 \div 11 = 11$

1. *Multiply:*

12	12	12	12	12	12	12	12
2	3	4	5	6	7	8	9

2. Since $4 \times 12 = 48$, $12 \times 4 =$ what?

3. Write out and memorize the table of 12's.

4. Multiply 246 by 12.

246
12
2952

Multiply by 12 as you did by 11, page 152.

Multiply:

5.	6.	7.	8.	9.	10.	11.
426	537	642	753	832	942	763
12	12	12	12	12	12	12

12. *Divide:*

12)24 12)36 12)48 12)60 12)72 12)84 12)96 12)108

13. Write out and memorize the table of 12's in division.

Table of 12's

$12 \times 1 = 12$	$12 \times 6 = 72$	$12 \div 12 = 1$	$72 \div 12 = 6$
$12 \times 2 = 24$	$12 \times 7 = 84$	$24 \div 12 = 2$	$84 \div 12 = 7$
$12 \times 3 = 36$	$12 \times 8 = 96$	$36 \div 12 = 3$	$96 \div 12 = 8$
$12 \times 4 = 48$	$12 \times 9 = 108$	$48 \div 12 = 4$	$108 \div 12 = 9$
$12 \times 5 = 60$	$12 \times 10 = 120$	$60 \div 12 = 5$	$120 \div 12 - 10$

14. Remember these: $12 \times 11 = 132$ $12 \times 12 = 144$

1. How many men in 2 football elevens? In 3 teams? In 4 teams? In 5 teams?

2. A school had a first, second, and third football team. How many men in all of the teams?

3. There are 33 boys who play together in a neighborhood. How many football teams can they organize?

4. If the suit of each man on a football eleven costs $2.85, how much does it cost to get suits for all of the team?

5. If a pair of football shoes cost $3.95, how much does it cost to get shoes for the whole team?

6. Each man on a football eleven bought a jersey costing $5. How much was spent for all the jerseys?

7. How many plants can be set in 3 rows, if there are 11 plants in a row? In 4 rows? In 5 rows? In 6 rows? In 7 rows? In 8 rows? In 9 rows? In 10 rows?

8. Draw diagrams to show how many square inches there are in a rectangle 11 inches long and 3 inches wide; 4 inches wide; 7 inches wide; 9 inches wide.

9. How many things in a dozen? In 2 dozen? In 3 dozen? In 4 dozen? In 5 dozen? In 6 dozen? In 7 dozen? In 8 dozen? In 9 dozen? In 10 dozen? In 11 dozen? In 12 dozen?

10. A fruit vender bought oranges at 35¢ a dozen and sold them for 5¢ apiece. How much did he make on a dozen?

11. How many months in 8 years? In 9 years?

1. 10×4 is the same as $4 \times$ ——.
2. $10 \times 5 =$ ——; $10 \times 6 =$ ——; $10 \times 8 =$ ——.

A zero annexed to the right of a whole number changes the "ones" to "tens" and multiplies the number by 10.

3. *Give the products quickly:*

10×14	10×36	10×20	10×63	10×67
10×15	10×45	10×47	10×39	10×90
10×23	10×21	10×15	10×70	10×84

4. 2×3 or $3 \times 2 =$ ——.
20×3 or $3 \times 20 =$ ——.

5. 4×2 or $2 \times 4 =$ ——.
40×2 or $2 \times 40 =$ ——.

6. *Give products quickly:*

20×4	40×4	20×7	70×2	90×2
30×3	30×5	30×8	80×3	80×7
30×4	60×3	40×6	90×7	60×9

7. When you find 70×8 what do you first think? What do you do next?

We see then that to multiply a number by 70, we first multiply by 7, and then annex a 0.

Multiply:

8. 30×46.	12. 70×69.	16. 80×67.
9. 80×57.	13. 80×39.	17. 90×54.
10. 70×63.	14. 60×93.	18. 80×37.
11. 80×94.	15. 70×74.	19. 70×89.

1. 3 times 4 and 2 times 4 are how many 4's?

2. 5 times 8, 3 times 8, and 2 times 8, are how many times 8?

3. 20 times 8 and 5 times 8 are how many times 8?

4. 20 times 32 and 4 times 32 are how many times 32?

5. Then you can find 24 times 32 by finding 20 times 32 and 4×32 and adding; thus, —

32	32	128
$\times 20$	$\times 4$	$+ 640$
640	128	768

We do not need to do so much written work. While we are really doing the work under A, we write only that under B.

A	B
Think this:	*Write this:*
32	32
24	24
128 = product of 4×32	128
640 = product of 20×32	64
768 = product of 24×32	768

NOTE. — See that the abridged form under B is understood to mean the same as the complete form under A. Show that the position of 6 and 4 shows that they mean 640 and hence that 0 may be omitted.

Multiply:

6. 34×23.	10. 75×83.	14. 64×58.	18. 67×123.
7. 47×45.	11. 82×93.	15. 85×36.	19. 89×138.
8. 58×67.	12. 93×47.	16. 98×76.	20. 95×245.
9. 63×78.	13. 87×69.	17. 85×35.	21. 47×783.

1. When a man earns $75 in a month, how much does he earn in a year?

2. My house rent is $32 a month. What do I pay in 2 years or 24 months?

3. A farmer sold 84 young cattle at $26 each. How much did he get for them?

4. If each acre produces 28 bushels of wheat, what does a farmer get from 48 acres?

5. A dealer bought 18 sofas at $13.50 each. What did they cost him? What did he make on all if he sold them at $21.50 each?

6. A man bought a fruit farm of 26 acres at $245 an acre. What did it cost him?

7. A man has 26 rows of apple trees in an orchard. If he gathers 98 bushels from one row, what may he expect from the whole orchard?

8. How many square feet in the ceiling of a schoolroom 28 feet wide and 32 feet long?

9. My yard is 48 feet wide and 65 feet long. How many square feet does it contain?

10. Compute the number of square feet in a lawn 72 feet wide and 96 feet long.

11. How many inches long is your desk? How many inches wide is it? How many square inches are there on its top surface?

12. What is the cost of 96 bbl. of flour at $4.75 per barrel?

1. A grocer has two kinds of butter. One kind sells for 42 cents a pound, and the other for 36 cents a pound. How much will a family save in a year (52 weeks) by using the cheaper grade, if they use 2 pounds a week?

2. When round steak is 24 cents a pound and sirloin is 28 cents a pound, how much will a family that uses 64 pounds a month save by using round steak?

3. If you can buy two kinds of flour, one at 75 cents a sack and the other at 87 cents a sack, how much more would it cost you a year to use the more expensive flour, if you use 18 sacks a year?

4. I can buy a grade of coffee for 25 cents a pound or pay 38 cents for a pound can of better coffee. If I use 24 pounds a year, how much more does it cost a year for the better coffee?

5. I can buy good lard in the bulk for 16 cents a pound. A 2-pound bucket of lard costs 45 cents. If my family uses 36 pounds of lard a year, how much do I save in a year by buying lard in the bulk?

6. The grocer charges me 15 cents a can for corn, but by buying it by the dozen cans when he has a special sale of it, I get it for $1.15 a dozen. If I use 5 dozen cans a year, how much can I save in a year by buying it at the special sales?

7. The regular price of a piece of silk is $1.25 a yard. But by buying it at a special sale I get it for 85 cents a yard. How much do I save by buying 16 yards at the special sale?

At a candy store, the prices of candy are as follows:

Kind of Candy	Price per Pound	Price per 2-lb. Box	Price per 5-lb. Box
Caramels	$ 0.35	$ 0.60	$ 1.50
Nut Candy	.30	.55	1.35
Chocolate Creams	.40	.70	1.65
Fudge	.25	.45	1.00
Stick Candy	.20	.40	.85

1. How much do I save by buying a 2-pound box of caramels instead of buying two 1-pound boxes?

2. How much cheaper is a 5-pound box of caramels than five 1-pound boxes?

3. How much do one 1-pound box and two 2-pound boxes of nut candy cost?

4. How much cheaper is a 5-pound box of chocolate creams than five 1-pound boxes?

5. Make up other problems from the above table.

6. If the milkman charges 4 cents a pint bottle or 7 cents a quart bottle for milk, and we use 268 quarts of milk a year, how much cheaper is it a year to buy milk in quart bottles?

7. In some cities the street car fare is 5 cents when paid in cash, but by buying tickets instead of paying cash, one can take 25 rides for $ 1. If a boy rides to and from school each day for 175 days of the year, how much cheaper is it to buy the tickets?

Here is a picture of some shrubs and flowers planted by some school children.

1. Find the cost of the following: 24 plants of hydrangea at 25 cents each, and 18 of purple barberry at 35 cents.

2. Find the cost of 18 plants of syringa at 38 cents each and 9 spirea at 43 cents each.

3. How many plants are needed to plant a hedge 300 feet long if 2 plants are needed for every 3 feet of the hedge? How much will Japanese barberry cost for this hedge at 18 cents each?

4. How many plants will it take for an aster garden of 15 rows and 18 plants in a row?

5. From a little pansy bed, Mary picked 24 pansies each morning for 2 weeks. How many did she pick in all?

6. If geraniums cost 6 cents each, what will a bed of 75 cost?

7. Find the cost of a pansy bed of 8 rows of 18 plants each at 25 cents a dozen.

1. Mary and her father have been planting bulbs to-day. In one bed they planted 296 tulips, 649 crocuses, 214 hyacinths, and 492 narcissuses. How many bulbs in all?

2. In another bed in the form of a circle they planted tulips as follows: 76 white ones in the outer row, 48 pink ones in the next, and 55 irregularly in the center. Find the total number of bulbs and the cost at 3 cents each.

3. Alice made a little tulip bed. With a line she made 6 rows, 8 inches apart. Then she made 16 rows to cross these every 8 inches, so that she had her garden laid off into squares. She planted a bulb at the corner of each square. How many did it take? (Make a picture of this.)

4. John has a little truck garden. He planted 34 rows of lettuce with 49 plants in a row. How many plants did he set out?

5. Ned had $43.61 in the bank and drew out $7.94. How much remained?

6. Henry was agent for the "Uncle Sam Coasters." They cost him (including freight) $3.87 each, and he sold them for $5 each. How much did he make if he sold 15?

1. Fifty years ago, cranberries sold for 50 cents a bushel. They now sell for 15 cents a quart. What is the present price per bushel? How much have they increased in price per bushel?

2. An acre of bog sometimes yields 96 bushels of cranberries. When cranberries sell at $4 per bushel, how much does a farmer get from an acre of this bog? From 28 acres? From 57 acres?

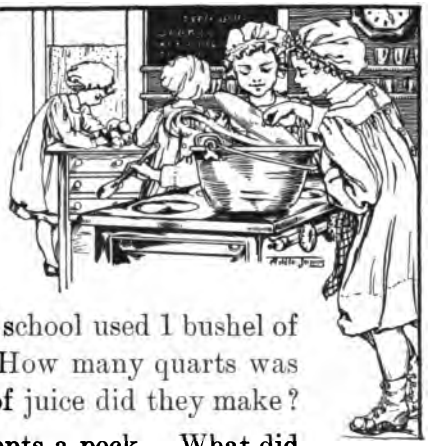
3. The largest cranberry bog in the world contains 160 acres. At 64 bushels per acre, how many bushels of cranberries would this bog yield? At $4 per bushel, what would these be worth?

4. A farmer has 38 acres of cranberries. If they yield 47 bushels per acre, how many bushels do the 38 acres yield? How many quarts? How much does the crop bring at 15 cents a quart?

5. Which bring the more money, 19 acres of cranberries that yield 26 bushels per acre, and sell at $4 per bushel, or 19 acres of corn that yield 74 bushels per acre, and sell at 65 cents per bushel? How much?

6. Indiana has 70 acres of cranberries that yield 62 bushels per acre. How many bushels does Indiana produce per year?

7. Wisconsin has 5821 acres of cranberries that yield 19 bushels per acre. How many bushels does Wisconsin produce per year?



1. In making apple jelly, 4 quarts of water should be put upon 8 quarts of apples. After cooking, 3 quarts of juice will drain from this. How many pints of juice is that?

2. A class in cooking at school used 1 bushel of apples in making jelly. How many quarts was that? How many pints of juice did they make?

3. The apples cost 45 cents a peck. What did the apples for this juice cost?

4. To each pint of juice 1 pound of sugar was added. How many pounds of sugar were required? How much did the sugar cost at 6 cents a pound?

5. They found that a pound of sugar added to a pint of juice made a pint of jelly. How many pints of jelly did they get in all?

6. They put the jelly into glasses holding $\frac{1}{2}$ of a pint each. How many glasses did it take?

7. The jelly glasses cost 18 cents a dozen. How much did all of the jelly glasses cost?

8. How many jelly glasses in 5 dozen? In 6 dozen? In 7 dozen?

9. If a jelly glass holds $\frac{1}{2}$ pint, how many glasses will it take for 2 gallons of jelly?

1. What is a merchant?

2. A merchant buys flour at $5 a barrel and sells it for $5.25. How much does he gain on each barrel?

3. To gain one dollar he would have to sell —— barrels.

4. If Harry buys bananas for 15 cents a dozen, and sells them at 2 cents each, how much does he make on every dozen?

5. A dealer bought coal at $4.75 a ton, and sold it for $5.50. What did he gain on the ton?

6. If you should buy a knife for 37¢ and sell it for a half-dollar, what would you gain?

7. Charles's father bought him a bicycle for $37. After 6 months it was sold for $34.50. What was lost?

8. A peddler bought a bunch of 108 bananas for $1, and sold them at 20 cents a dozen. He gained ——.

9. When a grocer buys pepper for 11 cents a pound and sells it for 16 cents a pound, he makes —— cents on every pound, or —— cents on 10 pounds.

10. If I gain 10 cents on every book I sell, to gain 80 cents I must sell —— books.

11. I bought a ball for $1, and sold it for 75¢. I lost ——.

12. A farmer bought a horse for $100. He traded his horse for a yoke of oxen and sold the oxen for $120. He gained —— dollars.

13. A provision dealer buys meat at wholesale for 12 cents a pound, and retails it at 16 cents. How much does he gain on 12 pounds?

Find the product of:

1. 46×843.
2. 38×729.
3. 87×394.
4. 46×798.
5. 77×936.
6. 93×827.
7. 59×846.
8. 49×306.
9. 43×643.
10. 37×845.
11. 45×846.
12. 47×268.
13. 97×643.
14. 84×962.
15. 79×796.
16. 97×867.

17. If your gas bill is \$2.75 per month, what is that per year?

18. If I can earn \$90 a month and spend \$56, what do I save in a year?

19. What is the cost of 13 lb. of sugar at 6¢ per pound and 5 lb. of coffee at 35¢ per pound?

20. A man left \$9000 to his family. Each of the 4 children received \$1750, and the widow the rest. What did the widow receive?

21. A farmer sold 365 bushels of potatoes at 45¢ and 302 bushels at 54¢. What did he receive for all?

22. How many square inches in an oblong 15 inches wide and 23 inches long?

23. Find the product of 97×897.

1. What will 37 lb. of butter cost at 25¢ a pound?

REMARK. — 25 cents may be written $0.25. In writing cents after $, it is best to place a zero before the point to show that there are no dollars.

Always separate dollars from cents by a **decimal point.**

What will be the cost of:

2. 37 gal. oil at $0.19?
3. 48 bu. oats at $0.59?
4. 59 yd. silk at $0.87?
5. 64 yd. carpet at $0.97?
6. 75 lb. tea at $0.63?
7. 89 lb. coffee at $0.55?

8. Find the cost of 36 pounds of coffee at 36 cents a pound, and 58 pounds of sugar at 6 cents a pound.

9. If I divide $37.50 equally among 5 boys, how much does each boy receive?

10. I earn $1500 a year; my expenses are $950. How much can I save in 10 years?

11. I went to town with $17.62 in my purse; I spent $10.11. How much was left?

12. Tom received a $20 bill for a birthday present. He bought a football for $4.75 and a saddle for $13.60. How much had he left?

13. A boy has a paper route with 56 customers. The paper is 45¢ per month. He collected $24.30 one month. How much is there yet to collect?

14. If a buggy costs $65, and a pony twice as much, how much do both cost?

1. My telephone costs $36 a year. What is my bill for the month of September if I have 12 extra calls at 5¢ apiece?

2. Mrs. Fisher bought a feather duster for $1.10, a whisk broom for 35¢, and a chamois skin for 20¢. Count her change back from a $5 bill.

3. Mrs. James paid $2 for currants and raspberries and 50¢ for sugar. She made 30 glasses of jelly, which she sold for 20¢ apiece. If the tumblers cost her 2¢ each, how much did she get for her labor?

4. When Sumner Ford opened the bank that his father gave him for a birthday present, he found that it contained $6.10. There were 3 50-cent pieces, 6 quarters, 14 dimes, 17 nickels, and a certain number of pennies. How many pennies were there?

5. If you can buy 3 bananas for 5¢, how much will a dozen cost?

6. Henry had a pair of new skates that cost $2.25. James gave him $1.50 and a new jackknife for the skates. How much was the knife worth?

7. What will be the total cost of the following articles:

1 clothes wringer	$4.75
1 glass washboard	0.65
25 cakes of soap at 3¢ a cake	

8. The postage on books is 1¢ for each 2 ounces. How much is the postage on a book that weighs a pound?

MARSHALL FIELD & COMPANY

STATE, WASHINGTON, RANDOLPH, AND WABASH

CHICAGO

NAME *Mrs. Butler*

RESIDENCE *5351 Southport Ave.*

DATE	DEPARTMENT	CLERK NO.	AMOUNT RECEIVED
9/17/10	*8*	*47*	*10 00*

QUANTITY	ARTICLES	PRICE	AMOUNT
2	*yd. Velvet Ribbon*	*45*	*90*
8	*yd. Lawn*	*35*	*2 80*
10	*yd. Gingham*	*15*	*1 50*

PAID
SEPT. 17
M. F. & CO.

18203–14

This is a memorandum of a customer's purchases, called a **sales check**. In a large department store it is customary to give such a check with the purchases made in each department of the store.

1. In the above check, who was the purchaser? Name the quantities of articles purchased, and the price per yard of each.

2. What was the cost of all of the goods bought? How much money was given the clerk? How much change was received?

In the problems below the symbol @ means *at*. For example, "3 yd. ribbon @ 15¢ $0.45" means that 3 yd. ribbon at 15¢ per yard cost 45¢.

In each of the following problems are given the purchases on a sales check. Find the total amount of each.

1. 6 spools thread @ $0.05.
   8 yd. gingham @ 0.20.
   4 yd. muslin @ 0.12.

2. 10 yd. silk @ $1.25.
   6 yd. cambric @ 0.15.
   2 yd. ribbon @ 0.35.

3. 4 yd. canvas @ $0.10.
   7 yd. linen @ 0.55.
   3 skeins floss @ 0.04.

4. 9 yd. lace @ 6¢.
   3 sticks braid @ 8¢.
   8 spools silk @ 10¢.

5. 4 lb. rice @ 12¢.
   5 lb. sugar @ 6¢.
   1 lb. coffee @ 30¢.

6. 2 bbl. flour @ $4.25.
   9 lb. bacon @ 0.28.
   5 lb. lard @ 0.18.

7. 7 yd. braid @ $0.14.
   2 doz. buttons @ 0.18.
   9 yd. gingham @ 0.42.

8. 3 lb. steak @ $0.24.
   4 lb. chicken @ 0.22.
   8 lb. bacon @ 0.26.

9. 2 lb. tea @ $0.65.
   4 bu. potatoes @ 0.85.
   6 cans corn @ 0.15.

10. 9 lb. sausage @ $0.12.
    5 lb. lard @ 0.16.
    3 lb. ham @ 0.30.

NOTE. — The game of *playing department store* by the pupils will be found interesting and furnish much valuable drill. Some of the pupils act as clerks in a department store, and the rest act as purchasers. Each clerk may have a card showing what kind of goods he has for sale. Clerks prepare slips of paper as sales checks. Each purchaser gets a sales check of the first clerk visited, and has the total computed by the last clerk visited. Purchasers check the computation of the clerk.

If one buys goods at a store, and does not pay cash for each purchase, but "runs an account," the store usually sends each month a *statement of indebtedness* called a **bill**.

The bill contains, (1) *a list of articles purchased*, (2) *the dates of the purchases*, (3) *the price, quantity, and cost of each article*, and (4) *the whole cost.*

When a bill is paid, it is **receipted**. That is, the one receiving the payment writes below it "Paid" or "Received payment," and signs his name.

CHICAGO, Dec. 1, 1910

Mr. E. F. Brown

Bought of WALLACE & COLE

DEALERS IN STAPLE AND FANCY GROCERIES

Nov.	5	½ bu. potatoes	@ $0.80		40		
		12 lb. sugar	@ .06		72	1	12
	12	2 lb. tea	@ .48		96		
		3 lb. butter	@ .32		96	1	92
	24	3 cans soup	@ .18				54
						3	58

Rec'd payment,
Wallace & Cole,
By Jones.

1. When were the goods purchased? Who was the buyer? The seller? Give the price and amount of each purchase. Is the bill correct? Has the bill been paid? By whom was it receipted? Why should one keep a receipted bill?

Rule paper and write a bill for each of the following groups, using any dates, and any names you choose for buyer and seller. Receipt each as if you were the seller or his clerk.

1. 23 lb. coffee @ $0.35
   6 lb. tea @ 0.50
   7 lb. lard @ 0.14

2. 16 yd. gingham @ $0.42
   4 doz. buttons @ 0.16
   12 yd. braid @ 0.14

3. 6 lb. butter @ $0.32
   3 cans peas @ 0.14
   2 pk. potatoes @ 0.23
   2 pineapples @ 0.14

4. 3 doz. oranges @ $0.35
   4 grape fruit @ 0.16
   4 doz. bananas @ 0.20
   6 lb. grapes @ 0.08

5. 5 plows @ $16.
   7 drills @ 32.
   5 wagons @ 83.

6. 23 hogs @ $ 9
   16 cows @ 42
   63 sheep @ 7

7. 78 lb. codfish @ 6¢
   56 lb. halibut @ 18¢
   2 bbl. herring @ $3.75

8. 5 gal. alcohol @ $2.32
   8 gal. ammonia @ 0.16
   7 lb. camphor @ 0.48

9. 84 qt. milk at 8¢; 18 pt. cream at 16¢; 3 lb. butter at 36¢; 2 lb. cheese at 18¢.

10. 10 yd. white goods at 22¢; 3 yd. ribbon at 12¢; 4 yd. braid at 8¢; 6 spools of thread at 5¢.

11. 2 doz. roses at 70¢; 6 doz. carnations at 60¢; 4 doz. tulip bulbs at 65¢; 4 bunches violets at 35¢; 1 doz. roses at 80¢; 1 fern at 75¢.

12. 3 lb. porterhouse steak at 28¢; 5 lb. lard at 18¢; 8 lb. bacon at 28¢; 7 lb. roast at 22¢; 6 lb. fish at 18¢.

WIELAND DAIRY COMPANY

All Our Milk and Cream Pasteurized and Bottled in the Country

CHICAGO, 7/1, 1910

Lawrence

1921 Evanston Ave.

	15	Quarts Milk	@ 8¢				
	16	Pints Milk	@ 5¢				
	5	½ Pint Cream	@ 10¢				
	4	¼ Pint Cream	@ 6¢				
	6	Quarts Buttermilk	@ 5¢				
	8	Pounds Butter	@ 34¢				

1. Above is a bill for the milk, cream, and butter received by a family from the dairy company during June. Complete the bill, and find the total amount.

2. During July this family had 12 quarts and 19 pints of milk, 1 ½-pint of cream, 8 ¼-pints of cream, 4 quarts of buttermilk, and 6 pounds of butter. Find the amount of the bill. On what date should this bill be sent?

3. Make and receipt a bill for the following month's supply of milk and butter, using the prices in the above bill: 17 qt. milk, 21 pt. milk, 3 ½-pt. cream, 7 ¼-pt. cream, 8 qt. buttermilk, and 7 lb. butter. Use any names you wish. Compute the full amount of the bill.

1. Compare 10×8 with 8×10.

2. $10 \times 6 =$ ——; $6 \times 10 =$ ——; 10 6's are ——; 6 10's are ——.

3. $\frac{1}{10}$ of 80? $\frac{1}{10}$ of 60? $\frac{1}{10}$ of 120? $\frac{1}{10}$ of 100?

4. What is the effect of annexing a zero to 8? Of removing the zero from 80?

5. If annexing a zero to 8 multiplies it by 10, how may you multiply 7 by 10? 9 by 10? 12 by 10?

6. $10 \times 13 =$ ——; $10 \times 15 =$ ——; $10 \times 25 =$ ——.

7. If removing the zero from 80 divides it by 10, how may you divide 90 by 10? 70 by 10? 120 by 10?

8. $\frac{1}{10}$ of 60 is ——; $\frac{1}{10}$ of 110 is ——; $\frac{1}{10}$ of 130 is?

9. 10×23? 10. 10×49? 11. $\frac{1}{10}$ of 230?

12. Compare 6×100 with 100×6? 6×1 hundred $= 6$ hundred, or $6 \times 100 = 600$, then $100 \times 6 =$ ——.

13. To get 600, what do we annex to 6? 600 is how many times 6? By what do we multiply 6 when we annex two zeros?

14. How do you multiply 7 by 100; 8 by 100?

15. If $100 \times 6 = 600$, what is $\frac{1}{100}$ of 600?

16. Removing *two* zeros from 600 gives ——, and is the same as taking $\frac{1}{100}$ of it, or dividing it by ——.

Principles. — 1. *Every zero annexed to a whole number multiplies it by* 10.

2. *Every zero removed from the right of a whole number divides it by* 10.

Multiply:

1.	18 by 10.	5.	5 by 100.	9.	96 by 10.
2.	27 by 10.	6.	25 by 100.	10.	84 by 100.
3.	63 by 10.	7.	32 by 100.	11.	385 by 10.
4.	95 by 10.	8.	76 by 100.	12.	20 by 10.

Divide:

13.	760 by 10.	17.	800 by 100.	21.	920 by 10.
14.	890 by 10.	18.	1200 by 100.	22.	3600 by 100.
15.	420 by 10.	19.	6500 by 100.	23.	750 by 10.
16.	640 by 10.	20.	8700 by 100.	24.	8000 by 10.

25. Compare $200 \times \$4$ with $100 \times 2 \times \$4$.

26. Compare $300 \times \$7$ with $100 \times 3 \times \$7$.

27. What is 400×9? 500×7? 40×9?

Written

1. What will 500 tons of hay cost at \$17 a ton?

WORK

$$\begin{array}{r} \$17 \\ 500 \\ \hline \$8500 \end{array}$$

EXPLANATION. — 500 tons will cost $500 \times \$17$. $500 = 100 \times 5$; $500 \times \$17$ is the same as $100 \times 5 \times \$17$. Multiplying \$17 by 5, we get \$85. We multiply \$85 by 100 by annexing two zeros, and get \$8500, the cost of 500 tons.

What will be the cost:

2. Of 70 tons of hay at \$18 per ton?
3. Of 40 tons of hay at \$16 per ton?
4. Of 600 tons of coal at \$8 per ton?
5. Of 800 cords of wood at \$4.25 per cord?

Variety	Legal Weight per Bushel	Amount Sown per Acre
Potatoes	60 lb.	10 lb.
Onion Sets	30 lb.	15 lb.
Oats	32 lb.	90 lb.
Barley	48 lb.	90 lb.
Corn	56 lb.	8 lb.
Timothy seed	45 lb.	12 lb.

This table gives the legal weights per bushel of certain farm and garden produce (weights are practically the same in all states), and the amount of seed sown per acre of ground.

1. Find the weight of 10 bu. of each thing. Of 40 bu.

2. Find the weight of 100 bu. of each. Of 300 bu.

3. Find the quantity of seed of each kind required to plant or sow 10 acres of ground; 50 acres; 90 acres.

4. Find the quantity of seed of each kind required to plant or sow 100 acres of ground; 400 acres; 600 acres.

5. Some things are bought and sold by the *hundredweight.* A hundredweight equals 100 pounds.

How many pounds in 3 hundredweight of nails? In 15 hundredweight? In 38 hundredweight? In 90?

6. A merchant goes to the bank to get small change. How many dimes can he get for $6? For $18?

7. If a printer earns 48 cents an hour, how much does he earn in six 8-hour days?

1. One ounce of radish seed will sow a row of radishes 100 ft. long. How many ounces are required to sow a row 200 ft. long? One 600 ft. long? One 800 ft. long?

2. One ounce of turnip seed will sow a row 100 ft. long. How many ounces are required to sow a row 400 ft. long? One 700 ft. long? One 1000 ft. long?

3. One ounce of beet seed will sow a row 100 ft. long. How many ounces are required to sow a row 300 ft. long? One 1200 ft. long? One 2100 ft. long?

4. One quart of peas will sow a row 100 ft. long. How many quarts are required to sow a row 500 ft. long? One 1600 ft. long? One 2300 ft. long?

5. One quart of corn will plant 200 hills. How many quarts are required to plant 400 hills? 800 hills? 1200 hills? 3200 hills?

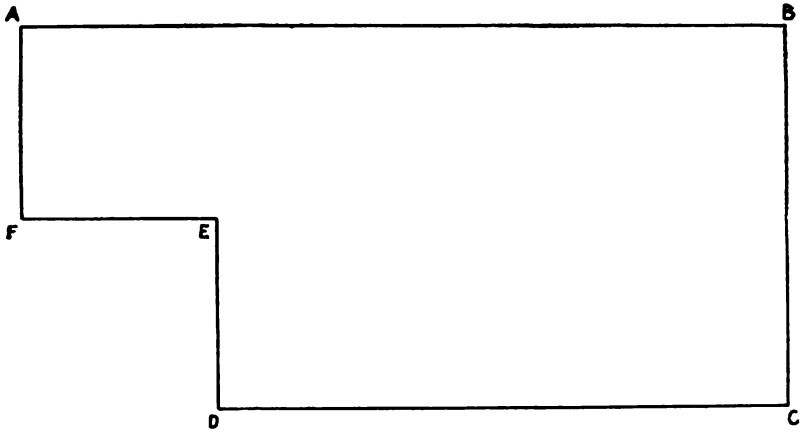
6. I have 60 pennies which I wish to exchange at the bank for dimes. How many dimes can I get for them?

7. If you had 140 pennies, how many dimes could you get for them?

8. If you had 240 dimes, how many dollars could you get for them?

9. If you had 400 pennies, how many dollars could you get for them?

10. A bank received one day a shipment of 2850 dimes from the United States Treasury. How many dollars was that? It received also 36,700 pennies. How many dollars was that?



This is the plan of a house in which 1 inch represents 10 feet.

1. With your ruler, measure each of the lines. How many inches is AB? BC? DC? DE? FE? AF?

2. How many feet long is the side AB of the house?

3. How many feet wide is the end BC of the house?

4. How many feet does DC represent? DE? FE? AF?

5. Draw a plan of your schoolroom, letting a line 1 in. long represent 10 ft.

6. If a house were 40 ft. wide and 60 ft. long, and in the plan of it 10 ft. were represented by 1 in., how wide would the plan be? How long?

7. On a map of the United States in which a distance of 100 miles is represented by 1 inch, Cleveland and Chicago are 3 in. apart. How many miles is it from Chicago to Cleveland?

1. I sell a house and lot for $4865. If this is a loss of $690, what did the property cost me?

2. I sold a house for $3968, thereby making $275. What did I pay for the house?

3. I have three horses that cost me $498. If I sell one for $235, another for $155, and the other for $125, how much do I gain?

4. I pay 56 cents a bushel for potatoes, and sell them at a profit of $\frac{1}{4}$ the cost. At what price do I sell? What do I gain on 98 bushels?

5. I bought a field of 10 acres for $1000; I sold 7 acres of it at $125 an acre, and the rest at $85 an acre. How much did I gain?

6. If there are 25 cakes of soap in a box, and I sell it for 10¢ a cake, what do I make on a box if it costs me 75 cents?

7. I bought a horse for $360, and sold it, gaining $\frac{1}{3}$ as much as the cost. For what price did I sell it?

8. I buy paper at 12 cents a pound, and sell it for 20 cents a pound. What do I gain on 548 pounds?

9. If I buy butter at 20 cents a pound, and sell it to gain $\frac{1}{5}$ the cost, what do I receive for 245 pounds?

10. I bought coffee at 23¢ per pound, and sold it for 38¢. What did I gain on a bag containing 324 pounds?

11. A grocer buys canned corn at $1.00 per dozen, and sells it to gain $\frac{1}{5}$ the cost. What does he make on 24 dozen?

Some girls held a fair and raised money to send sick children to the country for a vacation.

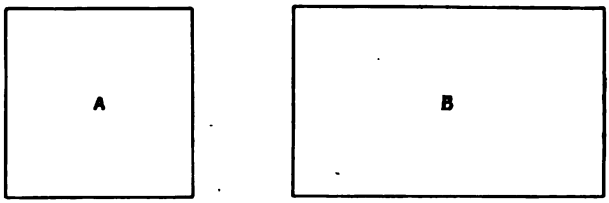
1. At the flower booth they sold 81 roses at 6¢ each; 9 dozen violets at 25¢ a dozen; 4 dozen carnations at 6¢ each; and 14 mixed bouquets at 45¢ each. How much money did they receive at the flower booth?

2. At the candy booth they sold 324 pieces of fudge at 6 for 5¢; 186 pieces of butter-scotch at 3 for 5¢; 96 pieces of molasses candy at 2 for 5¢; and 38 pieces of peanut candy at 5¢ each. How much did they receive at the candy booth?

3. At the pop-corn booth they sold 76 pop-corn balls at 5¢; 54 bags of pop-corn at 4¢; and 38 bags of peanuts at 5¢. What did they receive at this booth?

4. They served 38 dishes of ice cream at 10¢; 42 dishes of ice cream with cake at 15¢; and 55 glasses of lemonade at 5¢. What did they receive at this booth?

NOTE. — Have imaginary fairs or occupations in which children earn money for home or charity. Such problems are more interesting than those from material with which children are unfamiliar.



1. We measure **lengths** in *inches*, *feet*, and *yards*.

2. We measure **surfaces** in *square inches*, *square feet*, and *square yards*.

3. How many sides has a square? How do the sides compare in length?

4. Show a square on this page. How long is one side?

5. A **square inch** has sides each one inch long.

6. Lines that meet form **angles**. When they meet as the sides of a square, they form **right angles**.

The sides of a square are all equal, and the angles are all right angles.

7. Describe figure B on this page.

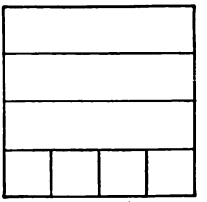
A flat surface whose sides are straight lines and whose angles are all right angles is a **rectangle**.

8. How does a figure like B differ from a square? A rectangle longer than it is wide is an ——.

9. Draw a square whose sides are each 2 inches. How many square inches does it contain?

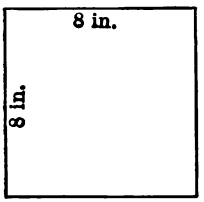
10. Draw an oblong 3 inches long and 2 inches wide. How many square inches does it contain?

1. Build a 4-inch square from 1-inch squares. How many square inches in a row? How many rows? How many square inches in all?

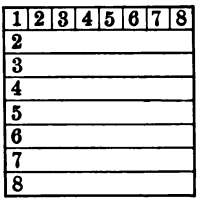


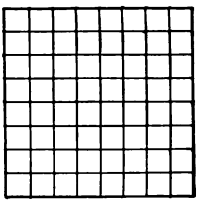
2. Draw a 5-inch square to the scale of $\frac{1}{4}$; that is, let $\frac{1}{4}$ inch represent an inch. Divide it into oblongs 1 inch wide and 5 inches long. How many square inches in each oblong? How many oblongs? A 5-inch square contains —— sq. in.

3. Can we draw an 8-inch square on this page? Why? Below we have drawn an 8-inch square on "a scale of $\frac{1}{8}$"; that is, $\frac{1}{8}$ in. represents 1 inch.



Scale $\frac{1}{8}$





4. To find the number of square inches in an 8-inch square, *first* find the number of oblongs 1 inch wide and 8 inches long. How many? *Then* find the number of square inches in each oblong. How many?

Then an 8-inch square contains 8×8 sq. in. or —— sq. in.

Draw these rectangles on a $\frac{1}{4}$ scale, and find the number of square inches in each:

5. 12 in. long and 5 in. wide.
6. 9 in. long and 7 in. wide.
7. 10 in. long and 7 in. wide.
8. 12 in. square.

1. Draw a rectangle 4 feet wide and 12 feet long to a scale of 1 inch to 1 foot. Mark it off into squares representing square feet.

How many squares in a row along the side?

How many such rows? Then how many square feet in the rectangle?

The rectangle contains 4×12 square feet, or 48 square feet.

Tell how many, drawing rectangles to illustrate:

2. 3×4 square inches = —— square inches.
3. 6×5 sq. in. = ?
4. 7×8 sq. ft. = ?
5. 7×10 sq. ft. = ?
6. 9×12 sq. in. = ?
7. 8×11 sq. in. = ?
8. 9×10 sq. in. = ?
9. 6×12 sq. in. = ?
10. 5×11 sq. ft. = ?

11. If a man owns a building lot 72 feet wide and 154 feet long, how many square feet does it contain?

12. If the building lot upon which you live is rectangular, find its width and length, then find how many square feet it contains.

13. Using 1 inch to represent 10 feet, draw to a scale a map of a building lot 60 feet wide and 150 feet long. How many square feet does it contain?

14. Let 1 inch represent 12 feet. Draw the floor of a room 24 ft. by 36 ft.

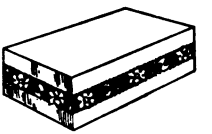
15. How long and wide will your drawing be if 1 inch represents 6 feet?

1. If a skate bag is $8'' \times 12''$, how much tape will it take to bind it, allowing twice the distance across the top, which is $8''$, and $2''$ extra for finishing?

NOTE. — $8''$ means 8 inches. $8'' \times 12''$ means 8 in. by 12 in.

2. A girl made a box mattress $7'' \times 10''$ for her doll. What was the length of the strip needed to go around it if $\frac{1}{2}''$ was allowed for sewing together?

3. A doll house is $9'' \times 12''$. How long a picture molding will it take to go around the room?



4. Alice is painting a border design to go around a $12'' \times 18''$ box. How many feet will it take?

5. A doll house has a window $4'' \times 7''$. The window frame is made of narrow strips of paper. How many inches will it take?

6. A dresser scarf for the doll house is $2\frac{1}{2}'' \times 4\frac{1}{2}''$. How long a border is needed to go entirely around the scarf?

7. A book bag is $11'' \times 14''$. Both sides have a border as shown in the picture. How many inches of border must be bought?

8. How much will tape cost at $4\frac{1}{2}¢$ a yard to bind a cushion $18''$ square?

9. Alice is to hemstitch a napkin $16''$ square. If the threads are drawn $1''$ from the edge, how many inches of hemstitching will there be?

1. To make some sheets for a doll's bed, a girl bought muslin 36 inches wide. How many $6'' \times 9''$ sheets can she make from 1 yard?

2. How many $6'' \times 8''$ mattresses for a doll bed can be made of 1 yard of 32″ ticking? (Remember that there must be a top and a bottom for each mattress.)

3. How many $9'' \times 12''$ sheets can be made from 1 yard of 36″ sheeting?

4. If it takes a 5″ square to make a stamp box, how many can be cut from a sheet of cover paper $25'' \times 40''$?

5. How many rectangles for trays $8'' \times 11''$ can be cut from a sheet of manila board $22'' \times 28''$?

6. To make a filing envelope requires a piece of paper $5'' \times 8''$. How many can be made from a sheet of manila paper $40'' \times 48''$?

7. A folder is made of a piece of manila tag $6'' \times 8''$. How many can be made from a sheet $24'' \times 26''$?

(Make a drawing to show how you would cut to avoid any waste.)

8. At 2¢ a sheet, how much will the paper for 39 folders cost?

9. How many blotters $9'' \times 12''$ can be cut from a sheet $19'' \times 24''$? How much is wasted?

10. A class made some $5'' \times 9''$ book covers from $19'' \times 26''$ sheets. How much of each sheet was wasted? How many covers were made from 8 sheets? How many could have been made from a $20'' \times 27''$ sheet?

1. If it takes a strip of cloth 2″ × 12″ to make the hinge of a book cover, how many can be made from 1 yard of cloth 36″ wide?

2. If it takes pieces of ticking 6″ × 9″ to make jackstone bags, how many can be made from ½ yard of ticking 36″ wide? How much will each bag cost if the ticking is 24¢ a yard?

3. A class made iron holders from a pattern 6″ × 12″. How many can be cut from 3 yards of burlap 36″ wide?

4. How large is the pattern for a school bag that is 12″ × 16″, not allowing for seams or hem? What length of 36″ stuff must be bought for a dozen bags?

5. Mary is going to buy some denim to cover 8 cushions 18″ × 18″ for porch furniture. How many yards will it take if it is 36″ wide? How much will it cost at 22¢ a yard?

6. Some girls are making some gingham pillow covers 18″ × 30″. How many can they make from 10 yards of gingham? At 18¢ a yard, how much will all cost? How much will each cover cost?

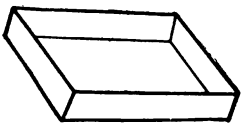
7. The teacher of the second grade cut some 3″ × 4″ number cards from a sheet 16″ × 27″. How many did she make from the whole sheet?

8. How many square feet of shingles does it take for a roof 16 feet wide and 38 feet long? It takes 9 shingles to cover 1 square foot. How many shingles are required for this roof?

1. How many square inches of ticking will be needed to make the top and bottom of a 5″ by 8″ mattress for a doll's bed?

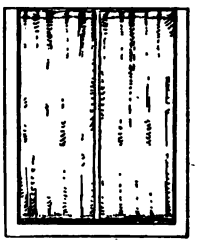
2. If it takes a piece of denim 6″ by 8″ to make a marble bag, how many square inches is that?

3. A doll bed is 7 inches wide and 10 inches long. The sheets for it are 3 inches longer and 2 inches wider than the bed. How many square inches in each sheet? In 6 sheets?

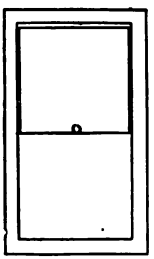


4. If a tray with straight edges is 3″ by 5″, and 1″ deep, how many square inches of blue tint board will it take to make it?

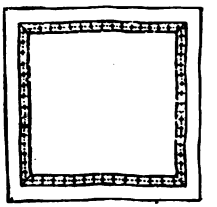
5. A calendar pad contains 12 sheets of paper 4″ by 7″. How many square inches of paper were used in the pad?



6. Between the living room and the dining room of a doll house is an opening 8″ high and 6″ wide. Allowing 2″ in width and 1″ in length for finishing, how many square inches of cheese cloth will it take for curtains?

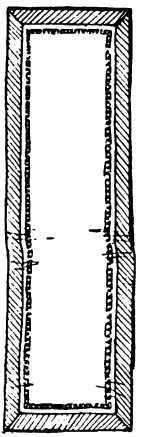


7. In a doll house are 6 windows, each 3″ by 5″. The shades are to cover half of each window. How many square inches of bookbinder's linen are needed for the shades?

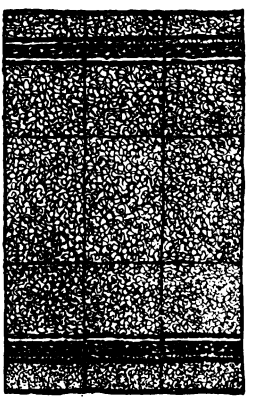


1. Alice planned to make a table cover one yard square, with an ornamental band stitched on three inches from the edge. How much banding must she buy?

2. A little girl's skirt is 2 yards wide. At 22¢ a yard, what is the cost of embroidery for a ruffle, if the ruffle must be $1\frac{1}{2}$ times as long as the skirt is wide, to allow for fullness?



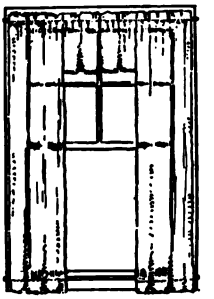
3. A dimity bureau scarf 12 inches wide and 4 feet long has a plain pink band 2 inches wide stitched around the border of it. How long is this band if we allow 2 inches at each corner for turning? How wide and how long is the scarf with the band added?



4. Nine girls each wove a small rug 12″ by $7\frac{1}{2}$″. These were sewed together to make a large rug. How long and how wide was the large rug?

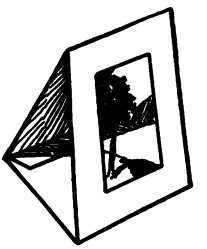
5. In a doll's hospital are ten beds. How many square inches of muslin are needed for one pair of sheets for each bed if each sheet is 12 inches by $7\frac{1}{2}$ inches?

1. A window is curtained with scrim as in this picture. Each long curtain is 2 yards long. The short center curtain is 15 inches long. Allowing a hem $2\frac{1}{2}$ inches wide at top and bottom, how much material is needed for a window? Find the cost at 18¢ a yard.



2. Elizabeth made a wash cloth 12 inches square with a hem on each edge. She could hem 8 inches in 10 minutes. Did she finish the hemming in the sewing hour?

3. Henry made a picture mount like this one. Each of its faces is $3\frac{1}{2}''$ by $6''$, and the flap is $3\frac{1}{2}''$ by $1''$. How large a strip of paper did Henry use?



4. The picture is $2\frac{1}{2}'' \times 5''$. How much of a margin is left on each side of it?

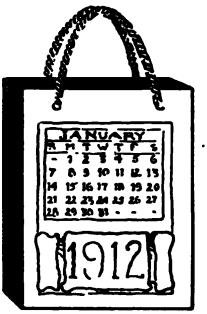
5. Grace framed 4 pictures. One was $6'' \times 8''$, one $5'' \times 7\frac{1}{2}''$, one $3\frac{1}{2}'' \times 5\frac{1}{2}''$, and one $7'' \times 9''$. How many inches of passe-partout paper did she use, allowing 1 inch at each corner for waste?

6. In a flower bed $5' \times 7'\ 1''$ ($7'\ 1'' = 7$ feet and 1 inch), tulips were planted along the edge, 5 inches apart. How many did the gardener have left from 5 dozen bulbs?

7. Henry can buy 6 jackstones for 3¢. How much will 10 jackstones cost? How large a jackstone bag will a piece of denim $16'' \times 7''$ make, turning down an inch for the hem?

1. A fourth-grade class planned a calendar of twelve sheets. Each sheet was $7'' \times 4\frac{1}{2}''$. How many calendar sheets were cut from a large sheet 22″ by 18″? Cut so as to have the least waste.

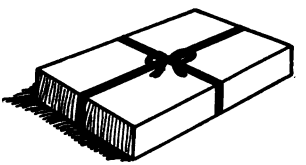
2. How many large sheets of paper did each child need? How many sheets would be needed in your room if each child made a calendar?



3. The twelve sheets were hung by a cord. Each cord was $9\frac{1}{4}''$ long. How many feet of cord were needed for 40 pupils?

4. The calendar had the year 1912 on it. Write it in Roman numerals. Write the date of the present year in Roman numerals.

5. The calendar was put into a box $7\frac{1}{2}'' \times 5'' \times 1''$. Miss Brown gave each child a ribbon with which to tie the box. How much ribbon did each child need, allowing 7″ for knot and crossing?

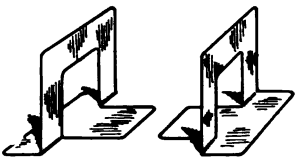


6. Each calendar, box, and wrapping weighed 6 oz. How much did it cost to mail John's, Mary's, Paul's, and Edith's at 1 cent for each ounce?

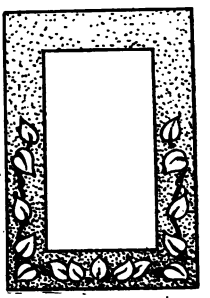
7. What was the entire surface of one of the boxes in square inches?

1. There were 18 pupils in a class in metal work, and each made a pin tray of hammered copper. For each tray a sheet of copper was cut 3″ wide and 7″ long. How many square inches of copper were used in each tray? How many in all of them?

2. Each of 24 pupils in metal work made a pair of book ends, like the figure. Each one was made of a piece of sheet copper 7″ long and 5″ wide. How many square inches of copper in each book end? In each pair? In all 24 pairs?

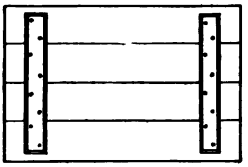


3. The same pupils each made a picture frame hammered from sheet copper. Each frame was made from a piece of copper 7″ by 5″. How many square inches of copper were required for the 24 frames? The opening for the picture in each was 3″ by 5″, and the piece cut out to make the opening was returned to the copper store. How many square inches of copper did each pupil return?



4. Each of a class of 36 pupils made a blotter 24″ by 18″. How many square inches of binder's board in the back of each blotter? In all? The corners for each blotter were cut from a piece of leather 3″ by 6″. How many square inches of leather on all the blotters?

The cost of lumber bought in small quantities is now generally computed by the square foot.

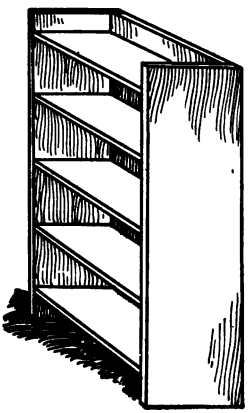


1. A boy made a table. The top was 3′ wide and 4′ long. How much did it cost at 9¢ a square foot?

2. John made a drawing board 2′ wide and 3′ long, of basswood. How much did the material cost at 7¢ a square foot?

3. Robert made his mother a dress box 2′ wide, 3′ long, and 1′ deep. It was of white pine, which cost 8¢ a square foot. Not allowing for waste, how much did the box cost him?

4. A class in woodwork made 25 ink trays. Each tray was made of two pieces, a base and a top. The base was 6″ by 9″, and the top 3″ by 7″. Allowing 7 square inches for waste for each tray, find the number of square inches of lumber required for the 25 trays.



5. Henry made this bookcase. It is 5′ high and 3′ wide. The shelves are 1′ wide and were cut from boards 3′ long. Find the cost of the lumber used at 9¢ a square foot.

6. Some boys built a kennel of pine, 3′ high, 3′ wide, and 4′ long. The flat roof was 4′ by 5′. They built a floor also. Find the cost of all the lumber at 8¢ a square foot, without the waste.

1. Find, as on page 181, the number of square inches in a 12-inch square.

2. What other name may we give to a 12-inch square?

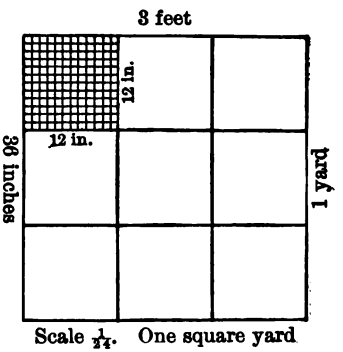
3. Cut a piece of paper a foot square and divide the surface of one side into square inches. How many?

A square foot contains 144 square inches.

4. On the blackboard draw a 3-foot square.

5. What other name may we give it?

6. Divide it into oblongs 1 foot by 3 feet. How many such oblongs? How many square feet in each? Then how many square feet in a square yard?



A square yard contains 9 square feet.

Draw diagrams and find the area of oblongs that are:

7. 12 feet long and 8 feet wide.

8. 16 feet long and 4 feet wide.

9. 9 feet long and 7 feet wide.

10. 15 feet long and 9 feet wide.

11. How many square yards in the ceiling of a room 4 yards wide and 7 yards long? How many square feet?

12. How many square feet in a wall 15 feet long and 9 feet high? How many square yards in the wall?

1. A book 7 inches by 9 inches has 52 leaves. How many square inches of paper in the book?

2. A rectangular box of bristol board is 12 inches long, 11 inches wide, and 9 inches high. How many square inches on the four sides?

3. Cloth board measures 22 inches by 28 inches. How many covers 7 inches by 5 inches can be cut from the board? How many square inches are waste?

4. How large a sheet of paper will be required to cover a book 8 inches by 6 inches, allowing 1 inch for the back, and 1 inch at the foredge, head, and tail for lapping?

5. A portfolio 10 inches by 12 inches is to be covered in cloth at $\frac{1}{3}$ of a cent per square inch. If 2 inches are allowed for the back, and 1 inch on all sides for lapping, how much will it cost?

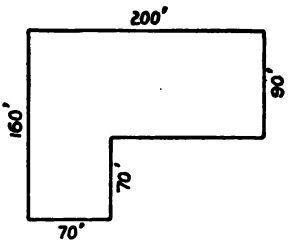
6. How many square inches in a calendar sheet 6 inches by 8 inches? How large a mounting board would be required to mount the sheets and leave a 2-inch margin? How many square inches of board would be exposed?

7. How many square feet of paper would be required to make a calendar if each sheet measures 3″ by 4″?

8. A carpenter's apron 16 inches long has pockets one-half the length. If the apron is 19 inches wide, how many square inches of cloth does it contain?

9. How much is waste if the above apron is cut from a piece of cloth $\frac{3}{4}$ of a yard long and 20 inches wide?

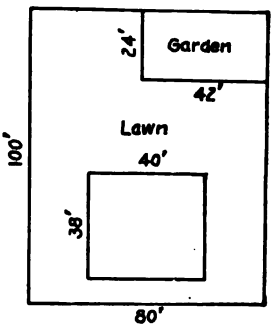
1. This drawing represents a piece of land that can be divided into two rectangles. 200′ means 200 feet. Divide the drawing into two rectangles. How long and how wide is each? Find the area of each rectangle, or the number of square feet it contains.



How many square feet in the whole piece of land?

2. A man's building lot is 80 feet wide and 100 feet long. On it are a house 40 feet by 38 feet, and a garden 24 feet by 42 feet. How much remains for lawn?

3. A man has a lawn 25 feet wide and 60 feet long. How many square feet does it contain? How much does it cost to have it sodded at 10 cents a square foot?



4. A man has a cement sidewalk made in front of his house. It is 48 feet long and 5 feet wide. How many square feet of it are there? He pays 25 cents a square foot to have it made. What does it cost him?

5. Measure the length and height of each blackboard in the schoolroom, to the nearest foot. Find the total number of square feet that the boards contain. What would they cost at 25 cents a square foot?

1. How many square inches in 5 square feet? 5×144 sq. in. = —— sq. in.

2. How many square inches in 12 square feet? In 56 square feet?

3. How many square feet in 4 square yards? 4×9 sq. ft. = —— sq. ft.

4. How many square feet in 20 square yards? In 36 square yards?

5. How many square yards in 36 square feet? 36 sq. ft. $\div$ 9 sq. ft. = ——?

6. How many square yards in 90 square feet? In 135 square feet?

7. A bathroom is 7 feet wide and 9 feet long. How many tiles, each 1 inch square, are required to cover the floor?

8. A railway platform is 4 yards wide and 65 yards long. How many tiles, each 1 foot square, are required to pave it?

9. A blackboard is 4 feet high and 18 feet long. What does it cost to have the surface refinished at 16 cents a square yard?

10. A man has a cement walk built 6 feet wide and 42 feet long. What does it cost him at 25 cents a square foot?

11. A wall between two rooms is 12 feet high and 30 feet long. What does it cost to have it plastered on both sides at 84 cents a square yard?

1. Short distances are measured in —— and ——. Longer distances are measured in **yards, rods,** and **miles.**

3 feet (ft.)	= **1 yard** (yd.)
5½ yards	= **1 rod** (rd.)
320 rods	= **1 mile** (mi.)

2. Draw a line one rod long on the blackboard or the floor.

3. Cut a piece of strong cord exactly 1 rod long. Use it to measure distances in rods.

4. Find in rods the width and the length of the school ground.

5. Find the length of a city block in rods.

6. Guess how many rods it is to some object. Then measure the distance and see how nearly you guessed it. Repeat this with many objects until you can guess a distance in rods accurately.

7. How many feet in 4 yards? In 10 yards?

8. How many rods in 2 miles? In 5 miles?

9. Find how many feet there are in a rod. $5\frac{1}{2} \times 3$ ft. = —— ft. $5\frac{1}{2} \times 3$ ft. is 5×3 ft. and $\frac{1}{2}$ of 3 ft., or —— ft. and —— ft.

10. How many yards in 2 rods? In 8 rods? In 10 rods?

11. Mr. Barnes has a field 80 rods square. How far must one walk to go around the field?

The distance around a rectangle, or the sum of its sides, is its **perimeter.**

1. Draw a square inch. How long is each side? What is the sum of the sides, or the perimeter of the square?

2. Draw a 6-inch square. What is its perimeter?

3. If a block is 458 feet square, how many feet do you go in walking around it?

4. A picture is 5 inches wide and 8 inches long. How much tape does it take to passe-partout it?

5. My trunk is 3 ft. long, 2 ft. wide, and 2 ft. high. How much rope does it take to go around it once the long way and once the short way, allowing 1 ft. for tying?

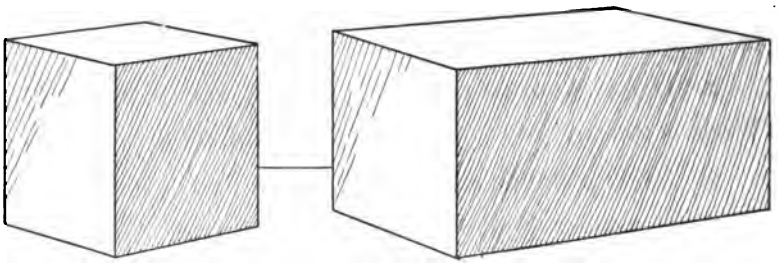
6. A room is 15 ft. wide and 18 ft. long. How many feet of picture molding does it take to go around it? How many yards?

7. How many yards of border are used in papering a room 14 ft. by 19 ft.? What does it cost at 18 cents a yard?

8. A farmer has a field 84 yd. wide and 100 yd. long. How much does it cost to build a fence around it at 18¢ a foot?

9. How many feet of wire does it take to build a 6-wire fence around a lot 27 yd. wide and 35 yd. long?

10. Mary has a pillow 22 inches square. She wishes to put a pillow cord around the edge. How many inches of cord must she buy? It is 2 yards and how many inches?



A cube A prism

1. A cube has *six faces* and each one is a *square.* If each face is a square inch, the cube is called a **cubic inch,** or a one-inch cube.

2. Put 2 one-inch cubes together and you have a **prism.** Give the dimensions of each face of such a prism.

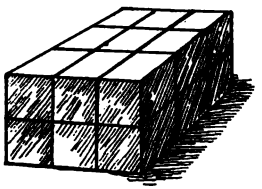
3. Place two prisms made from 2 one-inch cubes together. How many cubic inches are there? What are the dimensions of the second prism?

4. $\frac{1}{2}$ of a prism 2 inches long, 2 inches wide, and 1 inch thick is how many cubic inches? $\frac{1}{4}$ of the prism is how many cubic inches?

5. Make a prism of 3 one-inch cubes. Place two such prisms together. How many cubic inches in all? What are the dimensions of the second prism?

6. Build a 2-inch cube from one-inch cubes. How many one-inch cubes in the bottom layer? How many such layers? How many cubic inches in all?

NOTE. — For this work the pupils should have one-inch cubes. These may be obtained from dealers in kindergarten supplies.



1. How many cubes in one row of the first layer of the prism here represented?

2. How many such rows? Then how many cubes in the upper layer? 3×3 cubic inches = ——.

3. How many such layers in the whole prism? Then how many cubes in the whole prism? 2×9 cubic inches = ——.

4. From 1-inch cubes make a prism 3 inches wide, 1 inch deep, and 6 inches long. How many cubic inches did it take?

5. How many cubes will it take to make a layer three inches wide and 8 inches long? How many in 3 such layers?

6. If I place 24 cubes in a layer 4 inches wide, how long is it?

7. It takes 42 cubic inches to fill my pencil box. How deep is it if the bottom layer is 3 inches wide, and 7 inches long?

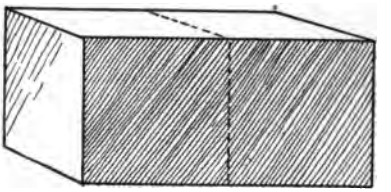
8. How many 1-foot cubes will fill a box 2 feet deep, 2 feet wide, and 6 feet long?

9. How many cubic inches in a prism 5 inches wide, 3 inches thick, and 10 inches long?

10. How many one-inch cubes will you need to build a prism 6 inches long, 4 inches wide, and 10 inches high?

1. How many faces has a cube? What is the shape of each?

2. How many faces has the solid here shown? What is the shape of each?



3. What name is given to both squares and oblongs?

A solid whose faces are all rectangles is a **rectangular solid.**

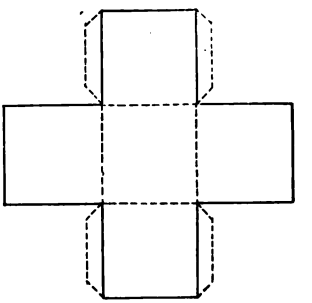
4. How many cubic inches in a rectangular solid 5 inches wide, 8 inches long, and 4 inches deep?

5. How many cubic inches in a box 7 inches wide, 10 inches long, and 6 inches deep?

6. Make from cardboard a box that will hold 8 cubic inches.

7. Make a plan for a box that will hold 12 cubic inches if it is to be 2 inches high. Make the box.

8. Draw a plan and make a 3-inch cube. What is the area of its surface? How many 1-inch cubes will it contain? Make a box that will hold 24 inch-cubes.



Scale $\frac{1}{6}$

9. How many cubes can you put in one layer in this box? How many layers?

1. How many cubic inches in a solid 3 inches wide, 12 inches long, and 4 inches high?

2. How many cubic feet in a solid 5 feet wide, 6 feet long, and 3 feet high?

The number of cubic inches, or cubic feet, etc., in a solid is its **volume.**

3. Give orally the volumes of rectangular solids as follows:

One 1 in. high, 2 in. wide, 3 in. long.
One 2 in. high, 5 in. wide, 6 in. long.
One 3 in. high, 2 in. wide, 7 in. long.
One 2 ft. high, 4 ft. wide, 5 ft. long.
One 4 ft. high, 6 ft. wide, 10 ft. long.

4. A lunch box is 4 in. deep, 4 in. wide, and 7 in. long. How many cubic inches in its volume?

5. How many cubic inches in a red brick 2 in. thick, 4 in. wide, and 8 in. long?

6. A flour bin is 2 ft. wide, 4 ft. long, and 3 ft. deep. How many cubic feet does it hold?

7. How many cubic feet in a block of marble 1 ft. thick, 3 ft. wide, and 6 ft. high?

8. A farmer has a corn crib 12 ft. wide, 18 ft. long, and 10 ft. high. How many cubic feet does it hold?

9. How many cubic feet does a wagon bed hold that is 2 ft. deep, 4 ft. wide, and 12 ft. long?

1. A ditch is dug 3 ft. wide, 5 ft. deep, and 80 ft. long. How many cubic feet of earth are removed?

2. A cellar is dug 5 ft. deep, 24 ft. wide, and 36 ft. long. How many cubic feet of earth are removed?

3. A teamster has a wagon bed 3 ft. wide, 9 ft. long, and 1 ft. deep. How many cubic feet of earth does he haul at a load? How many in a day, if he hauls 12 loads?

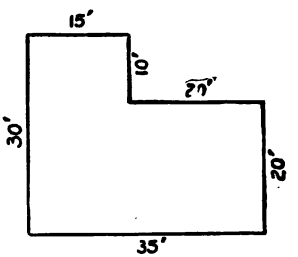
4. A freight car is 8 ft. wide, 7 ft. high, and 34 ft. long. How many cubic feet does it hold?

5. A stack of hay 8 ft. wide, 8 ft. long, and 8 ft. high weighs a ton. How many cubic feet is that?

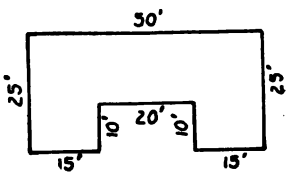
6. Measure your room, and find out how many cubic feet of air it holds.

7. Each person needs 30 cu. ft. of fresh air a minute. This would be a space 2 ft. wide, 3 ft. long, and how high?

8. This is the plan of a building. (15′ means 15 ft.) The excavation for the cellar is to be 5 ft. deep. Find how many cubic feet of earth must be removed.



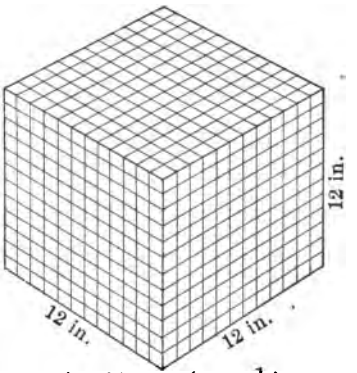
9. This is the plan of the basement of a building for which the excavation is to be 4 ft. deep. Find the number of cubic feet of earth to be removed.



1. How many inches in 1 foot? How many square inches in 1 square foot?

2. How many inches long is a 1-foot cube, or cubic foot? How many inches wide? How many inches high?

3. How many cubic inches in one layer of a 12-inch cube? How many layers? Then how many cubic inches in a **cubic foot**?



A cubic foot (Scale $\frac{1}{12}$)

1 cubic foot (cu. ft.) = 1728 cubic inches (cu. in.)

4. 2 cu. ft. = —— cu. in.

5. 7 cu. ft. = —— cu. in.

6. 25 cu. ft. = —— cu. in.

7. How many cubic inches in 48 cu. ft.?

8. How many cubic inches in $\frac{1}{2}$ cu. ft.? $\frac{1}{3}$ cu. ft.? $\frac{1}{4}$ cu. ft.? $\frac{1}{6}$ cu. ft.? $\frac{1}{8}$ cu. ft.? $\frac{1}{9}$ cu. ft.? $\frac{1}{12}$ cu. ft.?

9. If you forgot the number of cubic inches in 1 cubic foot, how would you reason it out again?

10. How many cubic inches of water in a tank 2 ft. deep, 2 ft. wide, and 3 ft. long?

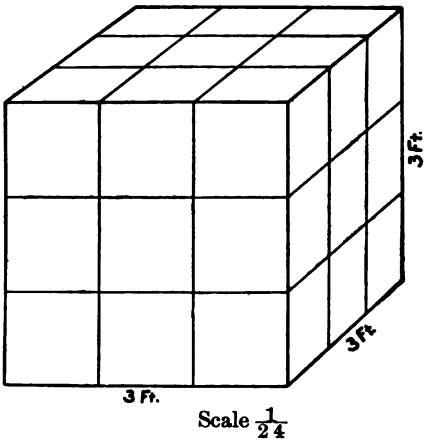
11. How many cubic inches of wall will 27 bricks make, each 2 in. by 4 in. by 8 in.?

12. How many cubic inches in a steel beam 6 ft. long, 2 ft. high, and $\frac{1}{3}$ ft. wide?

1. How many feet in a yard? How many square feet in a square yard?

2. How many feet long is a 1-yard cube, or cubic yard? How many feet wide? How many feet high?

3. How many cubic feet in one layer of a 3-foot cube? How many layers? Then how many cubic feet in a cubic yard?



4. 4 cu. yd. = —— cu ft.

5. 16 cu. yd. = —— cu. ft.

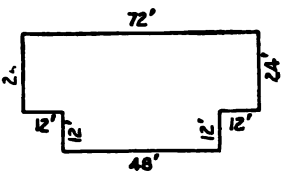
6. 180 cu. yd. = —— cu. ft.

1 cubic yard (cu. yd.) = **27 cubic feet** (cu. ft.)

7. How many cubic feet in $\frac{1}{3}$ cu. yd.? In $\frac{1}{9}$ cu. yd.?

8. A cellar is 6 ft. deep, 36 ft. wide, and 45 ft. long. What are the dimensions in yards? How many cubic yards of earth are removed in digging it?

9. This is the plan of the basement of a building. Find the dimensions of the basement in yards. If the basement is 6 ft. deep, how many cubic yards of earth will be removed?



1. How many seconds in one minute? In 5 minutes?

2. How many minutes in one hour? In 24 hours?

3. Estimate the length of *one minute* by keeping your eyes closed for a minute.

4. How many hours in one day? In 7 days?

5. How many hours do you spend in school in one day? In one week?

6. If you go to bed at 8 o'clock and get up at 6 o'clock, how many hours are you in bed?

7. How many days in one year? If you are in school for 5 days each week for 36 weeks, how many days of the year are you out of school?

8. How many months in a year? Name the months of the year in order. Which is the shortest month? How often does this month have one extra day?

9. Name the months that have 30 days. Name those that have 31 days.

10. If your vacation begins June 20 and ends September 7, how many days of vacation do you have?

11. How many minutes from 11:30 A.M. (30 minutes past eleven in the forenoon) until 1:20 P.M. (20 minutes past one in the afternoon)?

12. Albert took "Raft-mates" from the library on July 2. He kept it until July 20. After 2 weeks he had to pay a fine of 2¢ a day. How much was the fine?

13. How many days from July 4 to Christmas?

1. Divide 382 by 9.

$9\overline{)382}$

42, 4 remaining

Test: $9 \times 42 + 4 = 382$.

9 is contained in 382 forty-two times and 4 remains undivided.

Since 9 forty-twos and 4 more make 382, the division is correct.

The number divided is called the **dividend.**

The number by which we divide is called the **divisor.**

The number that shows how many times the dividend contains the divisor is called the **quotient.**

The number left undivided is called the **remainder.**

To test division, see whether the product of the divisor and the quotient, with the remainder added, is equal to the dividend.

Divide and test:

2. $594 \div 8$.
3. $687 \div 7$.
4. $843 \div 9$.
5. $628 \div 9$.
6. $864 \div 5$.
7. $786 \div 8$.
8. $943 \div 7$.
9. $698 \div 6$.
10. $1348 \div 6$.
11. $1765 \div 9$.
12. $3146 \div 7$.
13. $1898 \div 8$.

14. One box holds 6 cakes of soap. How many boxes will be needed for 804 cakes?

15. If there are 9 lozenges in one roll, how many rolls will 711 lozenges make?

1. A man paid $27 for a set of 6 dining-room chairs. How much was that for each chair?

2. Mrs. Scott paid $1.04 for an 8-quart crate of berries. How much was that a quart?

3. At 6 miles an hour, how long will it take a boat to sail 132 miles?

4. A plot of land with a frontage of 360 ft. is divided into 6 equal lots. What is the frontage of each lot?

5. When Mrs. Harris paid her ice bill, she found that she had used 7 cakes. The total weight was 357 pounds. What was the average weight of each cake?

6. When peaches are selling at $2.40 a bushel, how much is that a peck?

7. When a dress pattern of 12 yards is selling for $18, how much is that a yard?

8. When the expenses of a family are $16.80 a week, how much is that a day?

9. Broom bags cost 15¢ each. Mary got cloth to make 8 for 72¢. What was saved on each by making them? How much was saved on 8?

10. Seven tons of coal cost me $50.40. How much did I pay for a ton?

11. George paid $9.60 for a dozen hens. How much did each one cost him?

12. Charles Ford received $3 for *Saturday Evening Posts*. How many did he sell? The price of one *Post* is 5 cents.

1. How many 10's in 20? In 30? In 40? In 50?

2. $10 \times 25 =$ ——. Then how many 10's in 250?

3. How many 10's in 120? In 240? In 350?

4. 640 = 6 hundred and 4 tens. It is also 64 ——.

5. When a number ends in 0, the rest of the number tells how many 10's. Give the number of 10's in

480, 360, 300, 400, 560, 500.

We can divide a number ending in zero by 10, *by merely removing the* ——.

6. How many 2's in 4? How many 20's in 40?

7. How many 3's in 9? How many 300's in 900?

8. How many 4's in 12? How many 400's in 1200?

Give the quotients:

9. $80 \div 20$.	13. $360 \div 90$.	17. $600 \div 20$.
10. $600 \div 300$.	14. $7200 \div 800$.	18. $800 \div 20$.
11. $1200 \div 400$.	15. $4800 \div 600$.	19. $900 \div 30$.
12. $2500 \div 500$.	16. $5400 \div 900$.	20. $1200 \div 40$.

Before dividing a number ending in zero by another ending in zero, we may remove both zeros.

Divide:

21. $7290 \div 90$.	26. $1350 \div 30$.	31. $19{,}620 \div 90$.
22. $5760 \div 80$.	27. $5840 \div 80$.	32. $27{,}440 \div 80$.
23. $9660 \div 70$.	28. $3680 \div 80$.	33. $49{,}590 \div 90$.
24. $6570 \div 90$.	29. $5460 \div 70$.	34. $63{,}200 \div 80$.
25. $7360 \div 80$.	30. $3960 \div 60$.	35. $96{,}740 \div 70$.

1. Divide 765 by 9.

We think this:	*We write this:*
85	9)765
9)765	85
720 = 9 × 8 tens	
45 yet to be divided	
45 = 9 × 5 ones	*Test:* 9 × 85 = 765.

The longer form is called **long division**. In long division it is more convenient to put the quotient above.

2. Divide 6804 by 21.

WORK	EXPLANATION. — We think, 68 hundred ÷ 21 = 3 hundred, and we write 3 above in hundreds' place. Then 21 × 3 hundred = 63 hundred. Putting this under 68 hundred, we do not need to write the two zeros. We have 5 hundred and 4, or 50 tens and 4, yet undivided. We then think, 50 tens ÷ 21 = 2 tens (writing 2 in tens' place). 21 × 2 tens = 42 tens. Subtracting, we have 8 tens and 4 yet undivided. Then 84 ÷ 21 = 4. 21 × 4 = 84, so the entire number has been divided.
324	
21)6804	
63	
50	
42	
84	
84	
	Test: 21 × 324 = 6804.

NOTE. — The teacher should develop the final brief form (as shown in EX. 2) on the board, asking such questions as will lead the pupils to discover each step. There is no value in having pupils give a so-called explanation of a process. That they can answer your questions, and thus discover the process, is sufficient.

The teacher should also show the pupils that to determine each quotient figure it is necessary to notice only the first figure of the divisor and the first one or two figures of the dividend, as the case requires. In case the first two figures of the divisor are such as 29, 19, 38, etc., we use 3, 2, or 4 for the "first figures of the divisor."

Divide and test:

1. $1323 \div 21$.	6. $2193 \div 51$.	11. $4224 \div 32$.
2. $1554 \div 21$.	7. $2952 \div 41$.	12. $8996 \div 52$.
3. $1922 \div 31$.	8. $8231 \div 61$.	13. $16{,}992 \div 72$.
4. $11{,}172 \div 21$.	9. $9676 \div 41$.	14. $25{,}584 \div 82$.
5. $10{,}571 \div 31$.	10. $58{,}563 \div 81$.	15. $30{,}076 \div 73$.

Divide 897 by 21.

WORK

$$21\overline{)897}\quad 42$$
$$\underline{84}$$
$$57$$
$$\underline{42}$$
$$15$$

EXPLANATION. — 89 tens $\div$ 21 = 4 tens. Place the 4 tens in *tens' place*, over the 9 *tens*. 21×4 *tens* = 84 *tens*. 89 tens − 84 tens = 5 tens; 5 tens and 7 ones = 57. $57 \div 21 = 2$, which is written in the quotient over the 7. $21 \times 2 = 42$. $57 - 42 = 15$. Then the quotient is 42, and the **remainder** is 15.

Test: $21 \times 42 + 15 = 897$.

Divide these numbers by 21; 31; 41; 51; 61; 71; 81; 91:

16.	849	949	1592	6945	9478
17.	975	643	2436	7391	6492

Divide and test:

18. $7240 \div 50$.	22. $4782 \div 54$.	26. $8476 \div 58$.
19. $6893 \div 51$.	23. $6943 \div 55$.	27. $9371 \div 59$.
20. $7294 \div 52$.	24. $7382 \div 56$.	28. $7396 \div 58$.
21. $8476 \div 53$.	25. $9465 \div 57$.	29. $6984 \div 59$.

1. Divide 8008 by 26.

WORK

$$\begin{array}{r} 308 \\ 26\overline{)8008} \\ \underline{78} \\ 208 \\ \underline{208} \end{array}$$

REMARK.—The partial dividend 20 is smaller than the divisor 26. So we put 0 in the quotient, annex 8 to the 20, and say 26 in 208, 8 times.

Test: $26 \times 308 = 8008$.

2.	$3469 \div 62$.	9.	$8976 \div 92$.	16.	$550{,}112 \div 84$.
3.	$8328 \div 73$.	10.	$3481 \div 83$.	17.	$404{,}201 \div 74$.
4.	$5964 \div 82$.	11.	$5766 \div 74$.	18.	$40{,}121 \div 35$.
5.	$42{,}022 \div 43$.	12.	$303{,}211 \div 73$.	19.	$443{,}121 \div 44$.
6.	$42{,}202 \div 53$.	13.	$311{,}121 \div 83$.	20.	$13{,}496 \div 75$.
7.	$42{,}200 \div 73$.	14.	$342{,}221 \div 94$.	21.	$73{,}942 \div 65$.
8.	$40{,}220 \div 43$.	15.	$221{,}121 \div 103$.	22.	$96{,}847 \div 44$.

23. Divide 14,246 by 29.

WORK

$$\begin{array}{r} 491 \\ 29\overline{)14246} \\ \underline{116} \\ 264 \\ \underline{261} \\ 36 \\ \underline{29} \\ 7, \text{ remainder.} \end{array}$$

REMARK. — Since the divisor is so near 30, we use 3 to find the quotient figure and think "*nearly* 3" in 14; "*nearly* 3" in 26, etc.

Test: $29 \times 491 + 7 = 14{,}246$.

24.	$46{,}446 \div 19$.				
25.	$86{,}466 \div 29$.				
26.	$24{,}246 \div 39$.				
27.	$86{,}644 \div 49$.				
28.	$64{,}246 \div 59$.				
29.	$51{,}535 \div 69$.				
30.	$35{,}353 \div 79$.	32.	$31{,}533 \div 99$.	34.	$96{,}548 \div 98$.
31.	$33{,}353 \div 89$.	33.	$41{,}263 \div 48$.	35.	$76{,}324 \div 76$.

1. 18,639 ÷ 53.
2. 28,466 ÷ 27.
3. 46,035 ÷ 58.
4. 27,321 ÷ 24.
5. 31,406 ÷ 34.
6. 86,644 ÷ 47.
7. 64,246 ÷ 67.
8. 31,533 ÷ 97.
9. 54,394 ÷ 43.
10. 40,095 ÷ 38.
11. 13,555 ÷ 87.
12. 31,533 ÷ 58.
13. 60,803 ÷ 85.
14. 94,830 ÷ 69.
15. 65,400 ÷ 57.
16. 26,068 ÷ 98.
17. 96,068 ÷ 86.
18. 39,416 ÷ 32.
19. 83,472 ÷ 35.
20. 69,842 ÷ 52.
21. 17,863 ÷ 21.
22. 59,831 ÷ 31.
23. 57,632 ÷ 43.
24. 28,931 ÷ 51.
25. 29,364 ÷ 62.
26. 67,865 by 49.
27. 70,380 by 69.
28. 58,761 by 59.
29. 81,761 by 59.
30. 36,878 by 39.
31. 28,465 by 97.
32. 46,287 by 77.
33. 26,387 by 83.
34. 96,242 by 78.
35. 36,245 by 95.
36. 46,791 by 85.
37. 28,436 by 73.
38. 78,391 by 68.
39. 72,983 by 48.
40. 72,702 by 89.
41. 57,936 by 98.
42. 89,876 by 25.
43. 47,621 by 36.
44. 56,932 by 81.
45. 64,371 by 46.
46. 98,428 by 57.
47. 86,471 by 64.
48. 94,328 by 91.
49. 46,792 by 87.
50. 83,735 by 72.

1. If a train runs 798 miles in 21 hours, what is the average rate per hour?

2. If a dealer delivers 63,200 pounds of coal in 16 loads, what is the average size of each load?

3. A bushel of shelled corn weighs 56 pounds. How many bushels in a load of 2464 pounds?

4. If a car can haul 38 tons of coal, how many cars will be required to haul 1596 tons?

5. A bushel of onions weighs 57 pounds. How many bushels in a load that weighs 3591 pounds?

6. A family found that the expenses for the month of August were $119.66. What were the average daily expenses of the family?

7. A family found that their expenses for the year were $1378. What were the average expenses for 1 week? How much can this family save each week from a salary of $32 per week? How much in one year?

8. In 4 months a family had used 52 pounds of butter, and they found that the total cost was $16.64. What was the average cost per pound?

9. A dealer charged me $101.50 for 14 tons of coal. How much was that a ton?

10. How many towels 27 inches long can be cut from a bolt of toweling containing 51 yards?

11. Find the cost of each towel if the bolt costs $8.16?

Give the following:

1. $\frac{1}{6}$ of 18.
2. $\frac{1}{12}$ of 24.
3. $\frac{1}{9}$ of 27.
4. $\frac{1}{8}$ of 48.
5. $\frac{1}{12}$ of 72.
6. $\frac{1}{8}$ of 96.
7. $\frac{1}{6}$ of 84.
8. $\frac{1}{16}$ of 80.
9. $\frac{1}{4}$ of 96.
10. $\frac{1}{6}$ of 36.
11. $\frac{1}{8}$ of 72.
12. $\frac{1}{8}$ of 56.
13. $\frac{1}{9}$ of 72.
14. $\frac{1}{12}$ of 60.
15. $\frac{1}{9}$ of 104.

16. At \$1.60 a gallon, how much will a quart of oysters cost?

17. If your mother paid 96¢ for 8 yd. of lace, how much was the price a yard?

18. At 24¢ a pound, how much will 8 oz. of meat cost?

19. At 24¢ a pound, how much will 2 lb. 8 oz. cost?

24¢ 2 lb. 8 oz. = $2\frac{1}{2}$ lb.
$2\frac{1}{2}$
48 = 2 × 24¢, the cost of 2 lb.
12 = $\frac{1}{2}$ of 24¢, the cost of 8 oz.
60¢ = the cost of 2 lb. 8 oz.

20. Find the cost of 18 oranges at 36¢ a dozen.

21. Find the cost of 2 lb. 4 oz. of butter at 32¢ a pound.

22. I can buy 5-lb. boxes of butter that will last me 2 weeks, for \$1.65. I can buy butter bricks of 1 lb. 4 oz. at 36¢ a pound. How many bricks are equal to one box? How much shall I save in 4 weeks by buying by the box?

1. I bought a roast for dinner that weighed 5 lb. 8 oz. How much did it cost at 22¢ a pound?

2. I asked for 2 lb. of 24¢ steak. The piece weighed 2 lb. 4 oz. How much did it cost?

3. It took $5\frac{1}{2}$ yards of gingham to make Mary a dress. How much did it cost at 16¢ a yard?

4. Alice bought $10\frac{1}{2}$ yd. of cheesecloth at 6¢ a yard from which she made 9 dusters. How much did each duster cost?

5. At a bargain sale, the dealer deducted $\frac{1}{4}$ of the price of suits. Henry bought a suit that was marked at $10. How much did it cost him? How much did he save?

6. At 32 cents a yard, how much will $4\frac{1}{2}$ yards of damask toweling cost?

7. Find the cost of 4 yards of lace at $12\frac{1}{2}$¢ per yard; 2 yards of long cloth at 14¢ per yard; 2 bolts of tape at 4¢ per bolt; 5 yards of scrim at 15 cents per yard; and 2 spools of thread at 5¢ each. What change will a customer receive if he gives the clerk a $5 bill for these purchases?

8. Make out a *sales check* for the following:

5 yards of burlap at 19 cents a yard; 7 yards of gingham at 8 cents a yard; $5\frac{1}{2}$ yards of muslin at 14 cents; and a package of needles for 5¢.

9. A napkin is 27 inches square. How many yards of hemming are required for 1 dozen? How many stitches at 18 to the inch?

2 × 1 = 2	3 × 1 = 3	4 × 1 = 4	5 × 1 = 5
2 × 2 = 4	3 × 2 = 6	4 × 2 = 8	5 × 2 = 10
2 × 3 = 6	3 × 3 = 9	4 × 3 = 12	5 × 3 = 15
2 × 4 = 8	3 × 4 = 12	4 × 4 = 16	5 × 4 = 20
2 × 5 = 10	3 × 5 = 15	4 × 5 = 20	5 × 5 = 25
2 × 6 = 12	3 × 6 = 18	4 × 6 = 24	5 × 6 = 30
2 × 7 = 14	3 × 7 = 21	4 × 7 = 28	5 × 7 = 35
2 × 8 = 16	3 × 8 = 24	4 × 8 = 32	5 × 8 = 40
2 × 9 = 18	3 × 9 = 27	4 × 9 = 36	5 × 9 = 45
2 × 10 = 20	3 × 10 = 30	4 × 10 = 40	5 × 10 = 50
2 × 11 = 22	3 × 11 = 33	4 × 11 = 44	5 × 11 = 55
2 × 12 = 24	3 × 12 = 36	4 × 12 = 48	5 × 12 = 60
6 × 1 = 6	7 × 1 = 7	8 × 1 = 8	9 × 1 = 9
6 × 2 = 12	7 × 2 = 14	8 × 2 = 16	9 × 2 = 18
6 × 3 = 18	7 × 3 = 21	8 × 3 = 24	9 × 3 = 27
6 × 4 = 24	7 × 4 = 28	8 × 4 = 32	9 × 4 = 36
6 × 5 = 30	7 × 5 = 35	8 × 5 = 40	9 × 5 = 45
6 × 6 = 36	7 × 6 = 42	8 × 6 = 48	9 × 6 = 54
6 × 7 = 42	7 × 7 = 49	8 × 7 = 56	9 × 7 = 63
6 × 8 = 48	7 × 8 = 56	8 × 8 = 64	9 × 8 = 72
6 × 9 = 54	7 × 9 = 63	8 × 9 = 72	9 × 9 = 81
6 × 10 = 60	7 × 10 = 70	8 × 10 = 80	9 × 10 = 90
6 × 11 = 66	7 × 11 = 77	8 × 11 = 88	9 × 11 = 99
6 × 12 = 72	7 × 12 = 84	8 × 12 = 96	9 × 12 = 108
10 × 1 = 10	11 × 1 = 11	12 × 1 = 12	ROMAN NUMERALS
10 × 2 = 20	11 × 2 = 22	12 × 2 = 24	
10 × 3 = 30	11 × 3 = 33	12 × 3 = 36	
10 × 4 = 40	11 × 4 = 44	12 × 4 = 48	I = 1
10 × 5 = 50	11 × 5 = 55	12 × 5 = 60	V = 5
10 × 6 = 60	11 × 6 = 66	12 × 6 = 72	X = 10
10 × 7 = 70	11 × 7 = 77	12 × 7 = 84	L = 50
10 × 8 = 80	11 × 8 = 88	12 × 8 = 96	C = 100
10 × 9 = 90	11 × 9 = 99	12 × 9 = 108	D = 500
10 × 10 = 100	11 × 10 = 110	12 × 10 = 120	M = 1000
10 × 11 = 110	11 × 11 = 121	12 × 11 = 132	$\overline{M}$ = 1,000,000
10 × 12 = 120	11 × 12 = 132	12 × 12 = 144	